J. H. VAN DEVENTER
President and Editor

C. S. BAUR
Vice-President and General Manager

C. E. WRIGHT, *Managing Editor* — J. A. ROWAN, *News Editor* — A. I. FINDLEY, *Editor Emeritus*

R. E. MILLER, *Machinery Editor* — F. J. WINTERS, *Art Editor* — T. W. LIPPERT, *Metallurgical Editor*

Associate Editors
F. J. OLIVER — W. A. PHAIR — G. RICCIARDI

Washington Editors
L. W. MOFFETT — JAMES G. ELLIS

Resident District Editors
T. C. CAMPBELL, *Pittsburgh* — ROBERT G. BINGHAM, *Chicago*
D. R. JAMES, *Cleveland* — W. F. SHERMAN, *Detroit*

Editorial Correspondents
F. B. RICE-OXLEY, *London, England* — ROBERT G. McINTOSH, *Cincinnati*
G. FRAZAR, *Boston* — P. FIDRMUC, *Hamburg, Germany*
C. F. MEYER, *Milwaukee* — CHARLES POST, *San Francisco*
F. SANDERSON, *Toronto, Ontario* — CLYDE W. ENNIS, *Birmingham*
LEROY W. ALLISON, *Newark, N. J.* — ROY M. EDMONDS, *St. Louis*
F. T. TURNER, JR., *Buffalo*

★

A. H. DIX, *Manager Reader Service*

ADVERTISING STAFF

Emerson Findley, Robert F. Blair } 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Phila.
H. K. Hottenstein, 1012 Otis Bldg., Chicago
H. E. Leonard, 239 W. 39th St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 239 W. 39th St., New York
W. B. Robinson, W. J. Fitzgerald } 428 Park Bldg., Pitts.
D. C. Warren, P. O. Box 81, Hartford, Conn.
Don F. Harner, 1595 Pacific Avenue, Long Beach, Cal.

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index.
Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; Foreign, $12.00 a year. Single copy, 25 cents. Annual Number $1.00. Cable Address, "Ironage, N. Y."

★

Owned and Published by
CHILTON COMPANY
(Incorporated)

Publication Office
Chestnut and 56th Sts.,
Philadelphia, Pa., U.S.A.

Editorial and Executive Offices
239 West 39th St.,
New York, N. Y., U.S.A.

OFFICERS AND DIRECTORS

C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, *Treasurer*
JOHN BLAIR MOFFETT, *Secretary*
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF
HARRY V. DUFFY

THE IRON AGE

Contents

February 22, 1940

Monuments to Live Ones 19
Theory and Practice of Slag Control 21
Gating and Feeding of Castings 26
Grinding of Hardened Gears 29
Electric Ovens and Bicycle Production 33
What's New 34
Report of A.I.M.E. Meeting 36
On the Assembly Line 44
Washington News 48
THE NEWS IN BRIEF 66
Rate of Activity in Capital Goods 73
Weekly Ingot Operating Rates 73
Plant Expansion and Equipment Buying 90

▼ ▼ ▼

Free Industrial Literature 94
Products Advertised 96
Just Between Us Two 97
Index to Advertisers 122

Copyright, 1940, by Chilton Company (Inc.)

straight carbon tool steel

FOR LOW TOOL COST . . . AND LONG RUNS TOO!

POMPTON TOOL STEEL

known as Pompton Special, Pompton Extra and Pompton in various carbon tempers and suitable for numerous applications. The folder lists them, also gives data on best shop practice. Send for it today.

Any straight carbon tool steel which can be made into a die and punch like illustrated must be basically a super grade . . . it must be the result of careful selection of raw materials and melting, refining and pouring practice maintained at a high standard. The tools illustrated have been in service for years punching soft steel .125" thick. An unusual application for straight carbon tool steel . . . but those who know Pompton expect and get the unusual. Pompton in its various carbon tempers can be used over a wide range of applications. It's a good straight carbon tool steel to carry regularly in your stock. More details about Pompton will be found in the folder. Send the coupon for it.

Allegheny Ludlum
STEEL CORPORATION
WATERVLIET...N.Y.

AL

Manufacturers of Tool, Stainless, Carbon and Electrical Steels

Please send me:

☐ Certified Blue Sheet on Pompton

☐ New folder entitled "Straight Carbon Tool Steel in your Production Plans."

Name.....

Company.....

Street.....

City.....State.....

▲▲▲ THE IRON AGE ▲▲▲

FEBRUARY 22, 1940

ESTABLISHED 1855 Vol. 145, No. 8

Monuments to Live Ones

THE pyramids of Egypt were built to be the resting places for dead kings. They were "public works" projects of a sort which made plenty of work for thousands of slaves who received subsistence wages in the form of food and shelter while these monuments were in the making. In that respect, they resemble some of our present-day WPA projects. They also resemble some of them in the fact that after completion they had no economic value except as monuments to dead ones.

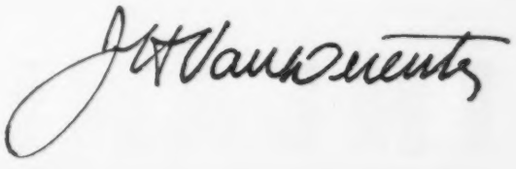
There are other edifices which are monuments to live ones. Monuments which create high wages for free men in their making and which continue to go on and on creating profitable working opportunities for other free men long years after their completion. Dynamic monuments, not static ones.

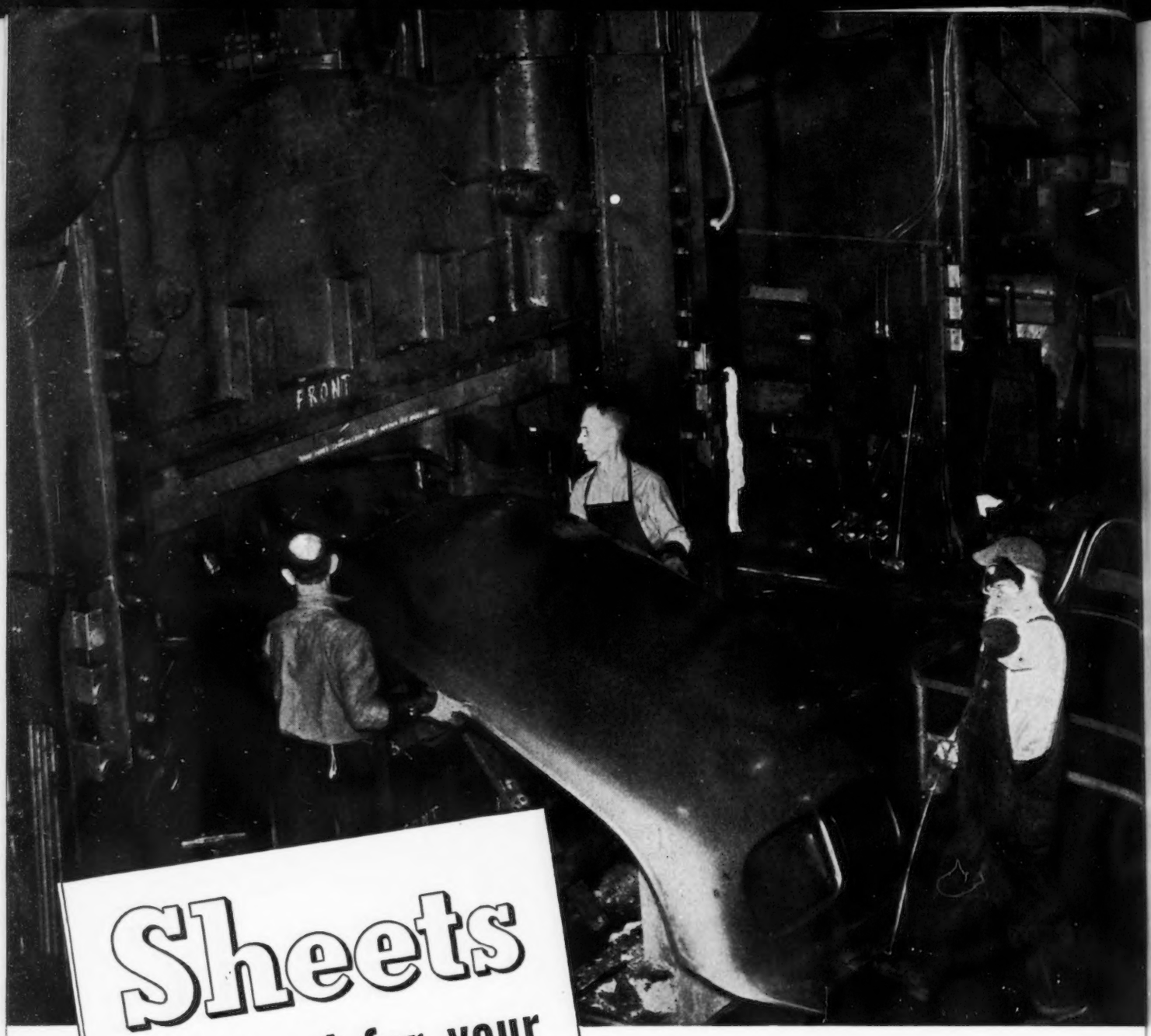
I visited one of these newly-erected modern monuments last week. It was the new home of Pratt & Whitney at West Hartford, Conn. If we had more men in America able and willing to erect such great new plants today, our economic troubles would be over and there would be no unemployment in this country for any man worthy of "earning his salt" in American industry.

One who visits such a plant cannot help but compare the relative values of public versus private initiative. Public initiative, with the power to commandeer the money from the taxpayers, can build libraries, schools and post offices and other edifices of granted social value which will cost the taxpayers still more money after they are completed and as long as they exist. On the contrary such edifices as Clayton R. Burt and his associates have just completed with private capital will create throughout their lives jobs and wages and a wealth of valuable self-liquidating profitable products from which new wealth and tax money will flow in increasing measure.

Men who are willing to invest their funds in these creative enterprises in these days of hesitancy are doubly entitled to be known as public benefactors.

What America needs today is more of these industrial monuments to the live leaders of private enterprise.





Sheets
developed for your exact needs

WHATEVER PRODUCT you make, your sheet steel requirements are peculiar to it—exacting. No one realizes this better than does Inland.

In serving many industries with hot and cold rolled sheets, Inland is called upon to develop and supply sheets with special properties to better meet such requirements as deep drawing, forming, welding, finishing—and scores of others. Inland does this as a matter of course—and co-operates with a thoroughness that may surprise you.

The chances are good that Inland metallurgists, with their broad experience, have already solved many of your problems and that they can aid you materially in improving your products or in reducing your costs.

An Inland specialist will gladly discuss the matter with you, without obligation.

INLAND STEEL CO.

38 S. Dearborn St., CHICAGO • District Offices: MILWAUKEE • DETROIT • ST. PAUL • ST. LOUIS • KANSAS CITY • CINCINNATI

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

Theory and Practice of BASIC OPEN HEARTH SLAG CONTROL

By F. M. WASHBURN and
W. O. PHILBROOK

Assistant Superintendent of Metallurgy and Inspection and Research Metallurgist Respectively, Wisconsin Steel Works, International Harvester Co.

EXTREME uniformity of properties is the order of steel making today. Thus, the problems involved in open hearth slag control are pre-eminent. This report goes far to simplify and clarify all these problems—and in this the first of four parts, the authors detail the functioning of the basic open hearth, slag formation, transfer of iron oxides, and measurement of oxidizing power.

THE users of steel have been and are now making steadily increasing demands upon the steel producers for steels having improved uniform physical properties. This has been brought about largely by the development of mass production methods in industry, particularly in the automotive field, which require a high degree of uniformity of material in production. There exists also a very natural trend toward cheaper materials which give the same properties as more expensive products formerly used, such as the replacement of alloy steels by special carbon steels with equal or better performance of the finished part.

These increasing demands have made it imperative for the steel producer to maintain closer control of chemical analysis ranges of the finished product, and to develop new methods of production and control to meet the requirements on cleanliness, grain size, hardenability, uniformity, and surface quality. Most of these properties have been fixed by the time a heat of steel is in the molds, and no subsequent treatment can remedy mistakes made by the open hearth department. Therefore, in order to govern the properties, it has been necessary to develop much closer control of open hearth practice.

Many varieties of control of the open hearth process have existed for years and are now being improved, and others are still in the process of development. The composition, physical characteristics and proportion of the various components of the charge, furnace design, fuel, combustion conditions, temperatures, slag composition and properties, furnace additions, furnace and ladle deoxidation, teeming conditions, and mold design and conditioning all have their effect upon steel quality and cost of production, and are controlled by the open hearth department. Of the above items, *the slag composition and properties throughout the course of the heat and the deoxidation practice followed are the major factors which influence the quality of the steel*, as well as most of the properties not determined solely by nominal chemical analysis.

The subject of slag control in the

basic open hearth process will occupy the balance of this article.

The primary aim of slag control is to regulate the rate of reactions and thereby regulate the degree of oxidation of the steel bath. The chemical reactions which take place in the furnace operate under the laws of physics and chemistry—these laws cannot be changed by any possible variety of manipulation, and any slag control practice which attempts to buck these laws is bound to be unsuccessful. For example, the operator can, at least for a transient period, slow down the rate of oxygen transfer to the bath, but he cannot stop or reverse the reaction.

tion is accorded to the self-governing characteristics of the basic open hearth process, which operates as it must, under the laws of physics and chemistry, slag control is in reality very simple. It has been thought desirable to present the underlying theory in sufficient detail to justify the recommendations offered, for the benefit of those to whom it may be interesting. However, the mathematical parts (set in small type and indented) may be skipped if the reader so desires.

Basic Open Hearth

Any discussion of slag control must take into consideration the fundaforming the slag. The basic open hearth process is a versatile one, as it can operate on charges ranging from nearly 100 per cent scrap to nearly 100 per cent pig iron, although in common practice the pig iron portion of the charge rarely exceeds 75 per cent. Also, in contradistinction to acid processes, the basic open hearth process can remove phosphorus in amounts of over 1 per cent of the charge and some sulphur, although elimination of the latter element is difficult and uncertain.

This report, however, will be limited to a discussion of heats made from pig iron produced from Lake ores,

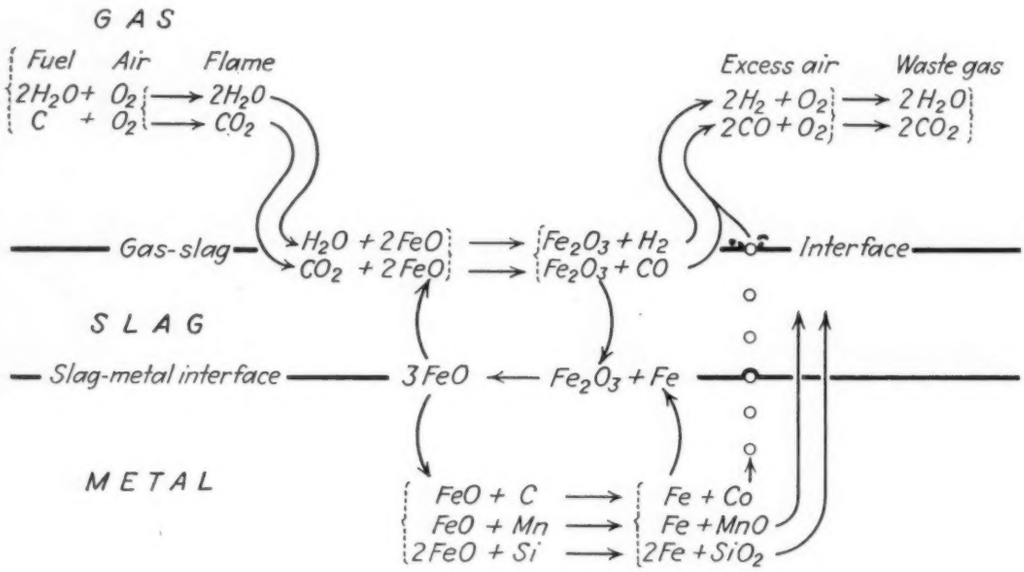


FIG. 1—Schematic representation of oxidation cycles in the open hearth.

There are certain definite factors in the reactions which take place in the open hearth which can be controlled by the operator. On the other hand, there are changes which he can only observe, and while such observation may be of interest, it is definitely not control. An effort will be made in this paper to distinguish between the limited number of factors which can be controlled and those changes which can be subject only to observation. The chemical reactions involved are so completely interrelated that it is impossible to deal with changes in any one reaction without considering the effects upon all the others.

A certain amount of mathematical and physical-chemical theory is necessary to explain these reactions in an adequate manner, and because such explanation is rather involved the feeling exists that slag control must also be complicated and mysterious. The authors believe that if due consideramental working of the basic open hearth process which places definite limitations on the conditions which can be arrived at by the use of slag control. Stripped of details of furnace design, the open hearth process consists of melting and refining steel on a relatively shallow refractory hearth, under a flame which is directly in contact with the charge over the full hearth area, and inclosed in walls and roof of refractory materials. During the production of a heat, a slag is formed which floats on the surface of the molten metal, constituting a barrier between the flame and the molten metal.

The charge for a basic open hearth heat ordinarily consists of a mixture of steel scrap and iron produced in a blast furnace, either in the form of pigs or as molten metal, which latter is ordinarily termed "hot metal." Either limestone or burnt lime is also added with the charge to assist in to eliminate consideration of high-phosphorus slags. The authors are primarily concerned with moderate iron charges which do not require a flush slag, but the discussion is applicable to all finishing slags after run-off.

The basic open hearth process is not simply one of remelting steel scrap. The components of the charge contain elements which must be removed to produce steel, such as carbon, silicon, phosphorus, and sometimes sulphur. A large part of the manganese in the charge is also lost, as well as some of the iron. These elements are removed by oxidation and, with the exception of carbon and sulphur which form gaseous oxides, their oxides combine with the lime charged to form the slag.

The chief source of the oxygen required for oxidation of these elements is the flame, although some oxygen is introduced in the form of rust on the charge, by additions of iron ore dur-

ing the course of the heat, and from the carbon dioxide liberated by calcination of the limestone. The flame is formed by the combustion of hydrocarbon fuels, solid, liquid, or gaseous, and the products of combustion contain considerable percentages of carbon dioxide and water vapor, and usually some excess air.

All of these gases are strongly oxidizing toward the slag and steel at the temperature level existing in the hearth. It is impossible to attain or maintain the temperature level necessary for operation with a flame produced with such a deficiency of air that it would be neutral or reducing toward the bath. Therefore, since the flame is at all times in contact with the bath, it may be seen *that the open hearth process is essentially an oxidizing process and cannot be otherwise.* This is a disadvantage, since the ideal procedure would be to complete the oxidation of the undesirable (and unfortunately some of the desirable) elements, then to change over to reducing conditions and deoxidize the steel completely in the furnace, as is done in the electric arc furnace. The best that can be achieved along this line is to slow down the *rate* of oxidation by slag control, after the major part of the refining has been accomplished by oxidation, and before any attempt is made to deoxidize the steel in the furnace.

Slag Formation

The real foundation of slag control is the charge, because the amounts of silicon and phosphorus to be eliminated govern the quantity of limestone which must be added to give a slag of the desired basicity, and likewise govern the slag volume. This statement will be developed more fully at a later stage of this discussion. The limestone is charged directly on the bottom of the furnace or over a light layer of scrap, and the balance of the scrap is then piled on top of the stone. The scrap is exposed to the direct action of the flame sweeping over and through it, and oxidation is rapid and extensive during the melting-down stage. When the pig iron or hot metal, as the case may be, is added, it too is subject to direct contact with the flame.

As a consequence of the oxidizing action of the flame, all of the silicon in the charge and much of the carbon and manganese have been oxidized by the time the heat is melted. The oxides of manganese and silicon, together with iron oxides, form a light, fluid, acid slag which rises to the surface of the molten metal and affords some protection from the direct oxidizing action of the flame. These acid premelt slags are composed primarily of iron and manganese silicates of the type $2FeO.SiO_2$ and $2MnO.SiO_2$, but even at this stage they contain relatively small amounts of lime (CaO), magnesia (MgO), and alumina (Al_2O_3), which are derived from erosion of the basic banks and bottom by the acid slag.

When the solid part of the charge is substantially under cover of the molten metal and heat has penetrated to the hearth, action begins on the limestone to give the familiar "lime boil." The CO_2 liberated by the decomposition of the limestone is an active oxidizing agent while rising through the bath, according to the reaction: $CO_2 + Fe = CO + FeO$. It may reasonably be assumed that this reaction goes practically to equilibrium, which corresponds to about 99 per cent of completion under conditions prevailing during the lime boil. In this case, 1000 lb. of limestone (98 per cent $CaCO_3$) will form about 700 lb. of FeO in the bath. Considered from a different angle, the CO_2 derived from a 6 per cent limestone charge is able to remove up to 0.70 per cent of carbon from the bath, and that from 8 per cent of limestone could eliminate 0.93 per cent carbon. The limestone therefore supplies a substantial fraction of the total oxygen requirement of the refining process.

As the lumps of calcined limestone rise to the surface and begin to go into solution in the slag, they effect important changes in its composition and in the reactions between the slag and the steel bath. The dissolving lime, being a much stronger base than iron and manganese oxides, replaces these oxides from their silicates with the formation of compounds such as $CaO.FeO.SiO_2$ and $CaO.MnO.SiO_2$. Later, as more lime goes into solution, this replacement is completed with formation of dicalcium silicate ($2CaO.SiO_2$). As still more lime is dissolved, calcium ferrites ($CaO.Fe_2O_3$ and $2CaO.Fe_2O_3$) and tricalcium silicate ($3CaO.SiO_2$) may be formed. The phosphorus in the charge is oxidized and combines with the lime in the slag to form tricalcium phosphate ($3CaO.P_2O_5$). Part of any fluorspar added to the slag reacts with the latter to form apatite [$CaF_2.3(3CaO.P_2O_5)$]. All of these compounds, together with free lime, FeO, and MnO, exist as a fluid phase

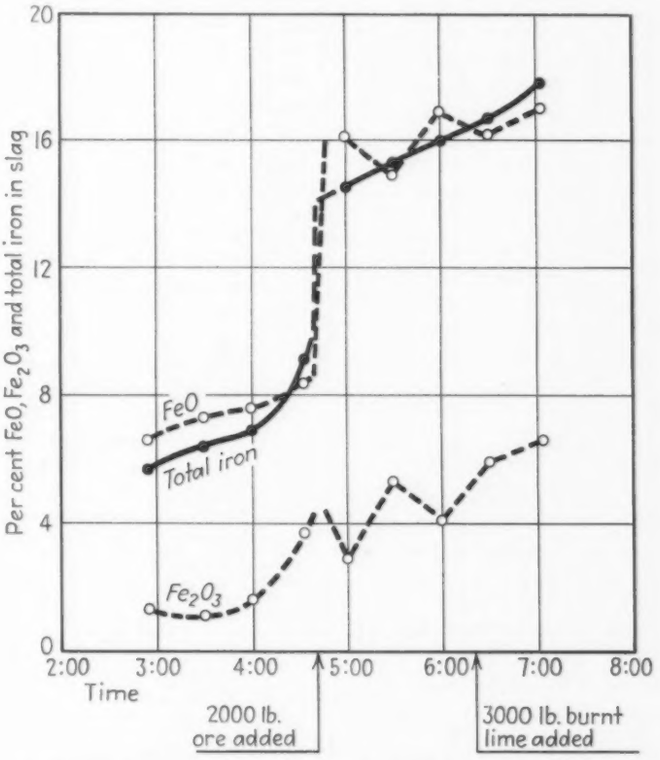


FIG. 2—Erratic variations in FeO and Fe_2O_3 analyses of an open hearth slag during the refining period.

in the slag, at least near the end of a heat.

The refractory bottom, which consists primarily of magnesite, is eroded by the bath and slag, and the MgO liberated is partly dissolved in the slag, but a large part of such magnesia persists throughout the heat as solid periclase, which is a mineral form of MgO. Since this periclase may hold in solid solution as much as 40 to 50 per cent of its own weight of Fe_2O_3, it may introduce errors in the chemical analysis of slags for active constituents with regard to both MgO and Fe_2O_3.

Other oxides, such as alumina (Al_2O_3), titania (TiO_2), and chromic oxide (Cr_2O_3), exist in the slag as compounds of little or no importance to slag control. As an example, spinel type minerals such as $MgO.Al_2O_3$ and $FeO.Cr_2O_3$ are frequently identified in early slags.

Although the above picture of slag formation appears rather involved, the salient feature is that the early slag is acid, and as lime is dissolved it replaces the weaker bases, FeO and MnO, with the formation of stable calcium silicates and a more basic slag.

Transfer of Iron Oxides

When enough lime has gone into solution to release FeO from its stable compounds as silicates, the liberated iron oxides are then free to enter into other reactions and to become the carrier of oxygen from the flame, through the slag, to the steel bath. The mechanism of this reaction was suggested by C. H. Herty, Jr.[1] Ferrous oxide in solution in the slag is oxidized at the upper surface of the slag, which is the slag-gas interface, to Fe_2O_3 by the flame. This Fe_2O_3 is carried, primarily by convection, to the lower surface of the slag, which is the slag-metal interface, and here reacts with Fe in the bath, giving up oxygen to form more FeO, part of which dissolves in the steel.

The FeO dissolved in the steel reacts with and oxidizes silicon, carbon, manganese and phosphorus, and is thus reduced to Fe again. The FeO in the slag formed by reduction of the Fe_2O_3 at the slag-metal interface returns to the upper surface of the slag to be re-oxidized by the flame to Fe_2O_3. This process of oxygen transfer from the flame to the bath may therefore be visualized as consisting of two cycles, one in the slag and one in the bath, as shown in Fig. 1. From a consideration of this mechanism it is evident that the rate of oxygen transfer to the bath, which determines the rate of elimination of metalloids, is dependent upon the concentration in the slag of the oxygen carriers, namely, the iron oxides, and the ease with which these oxygen carriers can migrate between the upper and lower surfaces of the slag. This ease of migration is largely a matter of slag viscosity and degree of agitation. The more action in the bath and slag, the greater will be the convection, and in addition the interface, at which the reactions take place, is greatly increased in area by the disturbances caused by the increased volumes of gases liberated from the bath. Since slag control is aimed at governing the rate of oxidation of the bath, it is therefore concerned primarily with regulating the content of iron oxides and the consistency or viscosity of the slag.

The introduction of FeO to the steel bath from the slag is a simple process of solution. As found by C. H. Herty, Jr.[1], and F. Körber[2], the solubility of FeO in liquid iron at 3000 deg. F. is 1.7 per cent. This is far above the amounts of FeO encountered in open hearth practice, and therefore the ability of the steel to dissolve FeO is not limited by this factor.

The distribution of FeO between the slag and the steel bath is subject to the physical law governing the distribution of a solute between two immiscible solvents. Therefore, if equilibrium conditions are assumed, which conditions in practice do not exist but can only be approached, the ratio of FeO in the slag to FeO in the steel bath is a constant at any given temperature, or

$$\frac{(FeO)_{slag}}{(FeO)_{bath}} = K_t \qquad (I)$$

Herty found that the value of this constant decreases with increasing temperature, which means that the solubility of FeO in the steel bath increases more rapidly than its solubility in the slag as the temperature is raised. The activity of the iron oxide in the bath is proportional to the weight per cent of FeO[3]. One of the difficulties in making practical use of the above expression, however, is the lack of exact knowledge of the activity of the iron oxides in the open hearth slags.

Measurement of Oxidizing Power

Several methods of deriving a measure of the activity of the iron oxides in the slag from the chemical analysis have been in common use. Per cent of FeO, total oxygen from iron oxides, expressed as ($FeO + 1.35\ Fe_2O_3$), the same figure corrected for basicity, the total of $FeO + Fe_2O_3$, and "total iron" in the slag have all been used.

The disadvantage of using expressions involving FeO and Fe_2O_3 is the practical impossibility of obtaining a sample of slag for chemical analysis which has the same proportion of these oxides as the slag in the furnace. The slag in the furnace varies widely from top to bottom in proportion of FeO to Fe_2O_3, due to the previously mentioned "carrier effect" of the iron oxides, and therefore the results obtained depend upon the position in the slag layer from which the sample is taken[1]. The proportion of the two oxides is also dependent upon cooling conditions, because of oxidation of FeO by air. This is illustrated in Table I by the sets of analyses of samples poured from the same spoonful of slag in such a way that one had normal access to air during cooling, while the other was protected from the air until black. These results could, of course, have been exaggerated by pouring the "cooled in air" sample in a very thin layer.

A combination of both of these effects is illustrated in Fig. 2, the data for which were obtained from a low carbon heat. It may be noted that there are erratic breaks in the FeO and Fe_2O_3 curves, with a rise in Fe_2O_3 accompanying a drop in FeO; these swings could not be correlated in any way with conditions in the furnace or the manner of working the heat. As is illustrated also by Fig. 2, the percentage of total iron in the slag is not affected by any of the conditions mentioned and has been found from experience to offer better correlation in the study of furnace reactions.

A true figure for the measure of the activity of a slag would be based upon mol per cent, and since present knowledge of the mode of combination in the molten slag of the separate oxides determined by chemical analysis does not warrant the calculation of mol fractions, it is pointless to use an elaborate expression for oxidizing power. As an empirical measure of the oxidizing power of a basic open hearth slag, the total iron content appears to be the best available at the present state of knowledge.

The total iron content of the slag does not by itself give a complete picture of the oxidizing power of a slag. As the basicity of a slag increases beyond a certain point, the increased total iron does not represent a proportional increase in oxidizing power of the slag. Herty[1] and Chipman[4] have both shown that as basicity of the slag increases, the ratio of iron oxide in

[1] C. H. Herty, Jr., C. F. Christopher, H. Freeman, and J. F. Sanderson, "The Physical Chemistry of Steel-Making. The Control of Iron Oxide in the Basic Open-Hearth Process." Cooperative Bulletin 68 (1934), Mining and Metallurgical Advisory Board, Carnegie Institute of Technology, Pittsburgh.

[2] Friedrich Körber, "Untersuchungen Über das Verhalten des Mangans bei der Stahlerzeugung," *Stahl und Eisen* 52, 133-44 (1932).

[3] H. C. Vacher, in discussion of reference (5).

[4] John Chipman, "Effect of Slag Composition upon Oxygen, Carbon and Sulphur in the Bath," 1937 Open Hearth Proceedings, 110-114, American Institute of Mining and Metallurgical Engineers.

the slag to oxygen in the steel does not remain constant, but increases linearly with rising basicity.

The methods of expressing basicity and iron oxide content of the slag differ, but in both cases the curves show the increase of this ratio to begin when the lime content of the slag exceeds slightly the amount necessary to form dicalcium silicate and tricalcium phosphate.* This decrease in the activity of iron oxides in the slag with increasing basicity is probably due to the formation of stable calcium ferrites, as postulated by Herty, since Fe_2O_3 bound in this manner would be inactive and no longer able to enter into the cycle of oxygen transfer from the flame to the bath.

It is possible to develop experimentally the relationship between basicity of the slag and activity, or oxidizing power, of the iron oxides over the usual range of conditions for a given shop. Several methods of deriving an expression of basicity from the chemical analysis have been used for theoretical work, but the only measure of basicity which is useful for practical furnace control is the ratio of lime to silica in the slag, because this can be estimated rapidly and fairly accurately from visual inspection of slag "pancakes." It seems unnecessary, however, to derive a formal relationship of this sort, because if the basicity of the slag is itself controlled within practicable limits, the oxidizing powers of slags with the same iron content will be equal.

Since the aim of slag control is to reproduce conditions which have been found by repeated observation to be best for a particular period in the heat, it is satisfactory for control purposes to know that slags of controlled basicity and given iron content will always have the same oxidizing power, even though this may not be strictly proportional to the actual iron analysis. In the production of quality killed steels, the range of basicity desirable during the refining stages of a heat is low enough so that ferrite formation is not at all extensive. It might be remarked, however, that in the production of rimmed steels, increasing the iron content of the slag by "control" through the use of large amounts of lime is to some extent misleading, because much of the iron oxides thus introduced into the slag are inactive toward the bath, although this is not intended to deny the necessity of increased basicity in rimming steel slags.

*Herty's curve shows a definite break at about 5 per cent of "excess lime." Chipman's curve does not indicate whether the line for variation of distribution constant with basicity may be extrapolated below a base:acid ratio of 1, or whether the FeO ratio becomes constant below this point in accordance with the distribution law.

TABLE I

Analyses Showing Effect of Oxidation by Air During Cooling of Slag Samples

Experiment	Method of Cooling	FeO, %	Fe_2O_3, %	Total Fe, %
A	Cooled in air	9.8	2.7	9.5
	Protected from air	10.6	1.8	9.5
B	Cooled in air	17.2	6.3	17.8
	Protected from air	17.9	5.6	17.9
C	Cooled in air	8.6	3.0	8.8
	Protected from air	9.6	2.0	8.9
D	Cooled in air	11.5	4.1	11.8
	Protected from air	12.5	2.6	11.5
E	Cooled in air	12.9	4.4	13.1
	Protected from air	14.0	3.3	13.2

Ed. Note:—In the second section of this report next week, the authors will describe the elimination of carbon from the bath, departure from equilibrium, rate of oxidation of slag and of bath, with proper calculations in each instance, and the effect of temperature.

Three Compositions of Sinterloy Steel

A NEW powder which may be pressed into any desired form by the accepted methods used in powder metallurgy is being distributed by Charles Hardy, Inc., 415 Lexington Avenue, New York. The powder designated as Sinterloy is available in three compositions for the production of steel carbon content of approximately 0.15, 0.4 and 0.8 per cent.

It is said that the material in most cases may be pressed directly into the shape of the finished product so that machining cost and metal losses are entirely eliminated. It is frequently used in particular applications where difficult machine work is required and exact duplications of parts desired. Excellent results are also claimed for applications where wear resistance is an important factor.

The Sinterloy powder is said to be suitable for products such as gears, cams, pump rotors, washers, pins, and rivets, and is being used for splines operating at high speed under alternating stresses where endurance to fatigue is of importance.

It is stated that the powder is dense and homogeneous and exhibits a negligible change of shape on sintering, and also that it may be hardened by heat treatment to the accepted hardness usually experienced with steels of corresponding carbon content. It also may be pack-hardened the same as ordinary steels.

The Sinterloy powder is stocked in the following compositions:

Sinterloy A	0.15 C.
Sinterloy B	0.40 C.
Sinterloy C	0.80 C.

These compositions contain carefully determined amounts of chromium. If toughness is particularly desirable nickel may be added in the amount of 1.5 to 3.0 per cent. The powder should be pressed at 50 tons per sq. in., and sintering should take place in a controlled atmosphere to prevent oxidation and decarburization. Time required is 6 to 8 hr. at 1075 deg. to 1150 deg. C. in the ordinary furnace or 2 hr. in a high frequency induction furnace.

The B grade can be heat treated to a hardness of Rockwell C 40 (Brinell 370); the C grade to Rockwell C 50 (Brinell 485). Tensile strengths of 80,000 to 120,000 lb. per sq. in. have been obtained. Under the microscope the usual steel constituents can be observed.

Gating and Feeding of CASTINGS

By ANTON JOHNSON
Works Manager, Oklahoma Steel Castings Co., Tulsa, Okla.

FOR many years the foundry industry has been producing what may be considered fairly good castings. A foundryman has a right to feel proud of his handicraft when one considers what he is expected to do with simple sand and metal, to say nothing of being required to meet specific chemical, physical and appearance requirements.

The improvements that have taken place in the production of castings from year to year may well be credited to the inclination of progressive foundrymen to take advantage of the data compiled by foundry technicians and scientists.

It will not be necessary to list here the many requirements imposed by casting buyers today as most foundrymen are familiar with them. It is desirable, however, to stress the importance played by gating and feeding in producing modern castings.

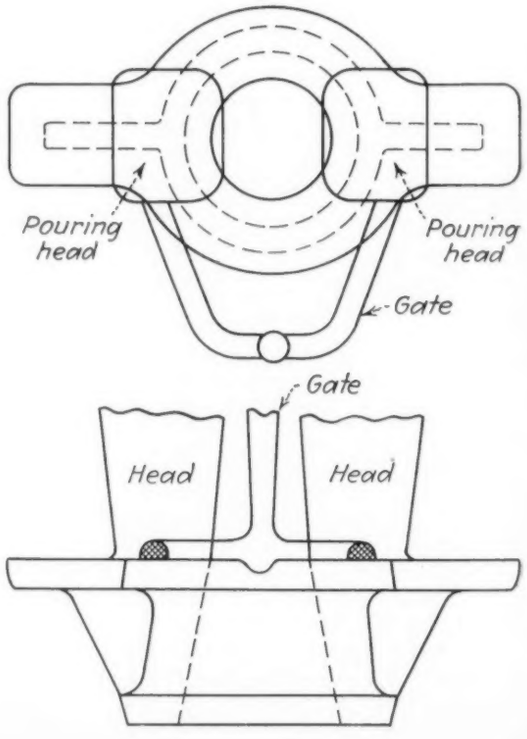
Jobbing Shop Practice

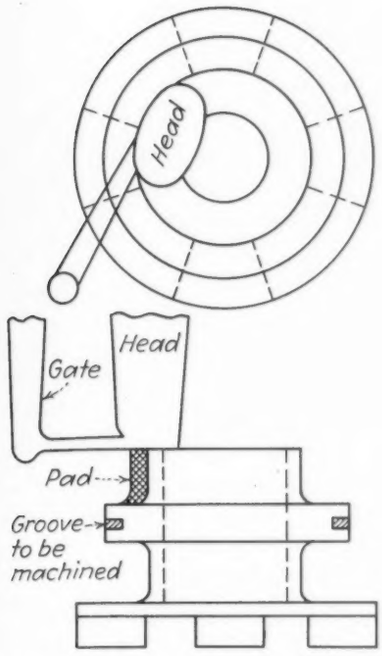
Gating and heading in a jobbing shop present many problems, due to the fact that changes in design to allow proper feeding are impossible, as the foundry is seldom consulted before the casting is designed and patterns are made. This makes it difficult to produce a sound casting without placing a considerable burden on the foundry, or even additional expense to the customer, in revamping the pattern before a satisfactory casting can be made.

Fluidity of metal, the law of gravity and rate of solidification all enter into the making of a sound steel casting. Much can be said in favor of mold manipulation pouring and centrifugal pouring, but these methods can only be applied when design permits and they require extreme care and special rigging. Therefore, the following data will deal only with the orthodox manner of pouring, that is, the mold when poured being on the same plane as when molded.

There are various kinds and ways of gating, and they all have their advantages—bottom or fountain, horn, bottom side in gate, gating on joint, step gates, top or pouring through head. These types are used single or multiple, according to size, shape and metal section of the castings involved. The aim in selecting a particular gate

GATING this flanged ring at the joints and into the heads proved to be an ideal arrangement — the result being cold metal at the bottom of the mold and hot metal in the heads where it was needed.

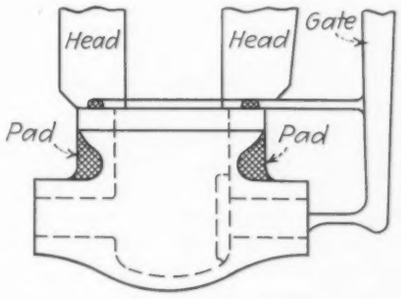




IT was imperative in producing this clutch that the flange metal be solid to avoid losses in machining the groove. To assure the flange metal being solid, the casting was gated into the head, with a pad leading from the head directly to the flange. The gate was cut on an angle to avoid cutting of cores. Gating from the bottom would have created numerous hot spots and shrinkage defects.

is to distribute metal uniformly to equalize shrinkage as much as possible and to avoid misruns.

A very important part of gating is the proper making of gates, both down and ingates. The old, and still too often used, practice is for the molder to use any stick or pipe that is close at hand, a practice inadvisable for several reasons. First, if too small, the casting may be badly misrun; if too large, metal is wasted, and a too large gate may even bleed the casting at the gate. Second, these sticks or pipes are very often rough or dented and may result in tearing apart the sand grains as these battered pieces are withdrawn from the mold, leaving a broken instead of a smooth sand surface. This makes it very easy for the rushing metal to cut into the disturbed sand grains, washing them into the mold and eventually trapping sand in the casting. Another cause of washed-in sand is improperly rammed and cut gates. A common sight is rough, knotty, irregular gates, due to soft ramming and careless cutting on the molder's part. Carelessness or ignorance on the molder's part in placing of gates is still another cause for cutting or washing of both mold and cores. Whenever possible, the gate should be placed so as not to let the metal



THIS screw-type valve called for joint and head gating. Pads under the heads help feed the heavy body section.

strike hard against mold or core. This can be done by placing the gate parallel or at an angle to the mold or core surface.

Tile or Core Gates Recommended

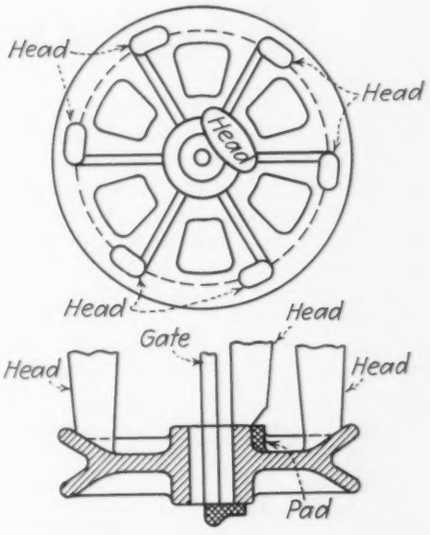
To avoid some of these bad practices, the writer recommends the use of tile or core gates. For light and medium sized work a core gate is very satisfactory. The well-known saying that "A chain is no stronger than its weakest link" can be changed to "A casting is no cleaner than its gate."

Improper placing of the gate often causes hot spots in casting that cannot be fed, resulting in shrink cavities to be found by the customer, sometimes only after considerable expense.

Heading has a direct relation to gating. The gate permits the metal to enter the mold, and the function of the head is to pack the metal in, or to feed the casting.

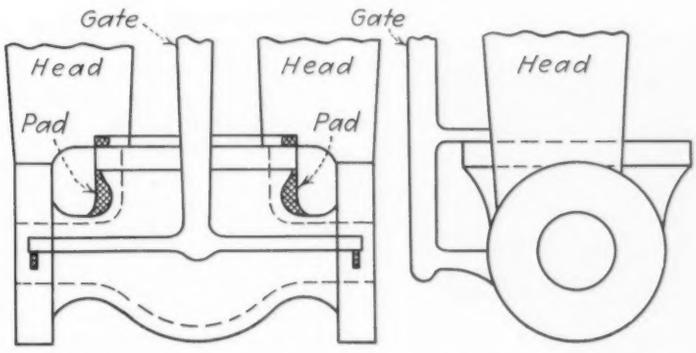
Feed Heads Important

The part of the casting at which the metal enters will stay the hottest, provided the metal sections are uniform. If they are not uniform, shrinkage and cavity problems are increased. It is, therefore, important to determine which part or parts will be affected by the temperature of metal at the

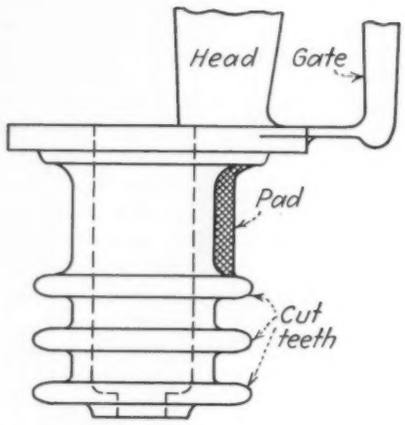


ANY blemish in the groove of this cable sheave is detrimental to long cable life and particular care in gating and feeding was necessary to eliminate the possibilities of defects at this point. A bottom gate into the hub, with heads at the intersections of groove and web, was used successfully in avoiding groove defects. Pad under the center head serves to feed a dangerous hot spot.

gate as well as at the heavy sections and intersections, where hot spots are likely to occur. These are the places where feed heads should be placed and the gate should be kept as close to one of these as possible in order that the head can so feed as to minimize hot



BRIDGE head feeding of both top and side flanges of this valve made it possible to consistently produce good castings. Note use of padding under the top flange to feed heavy body section.



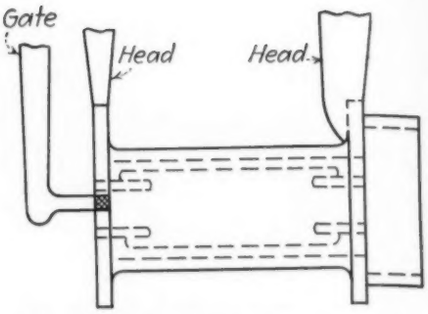
TOP and head gating was successfully used in casting this blank sprocket. Pads allow head to feed vital tooth sections.

spots. What is meant by natural hot spot is one caused by heavy sections or intersections. The artificial hot spot is the one caused by the gate. It, therefore, is necessary to have in some instances as many heads as there are hot spots, regardless of whether naturally or artificially created.

The most common position to place heads is on the uppermost part of the casting, but it is often necessary to place them on sides or even at the bottom, especially in cases of heavy metal sections that cannot be fed due to the lighter metal sections above, or due to having the gate into bottom and thus causing a hot spot.

In order to feed some non-uniform metal sections, it is often necessary to resort to padding.

The class of work made by Oklahoma Steel Castings Co. consists largely of oil country castings of various shapes and weights and must meet the most exacting requirements. Each casting presents a different gating and heading problem. A few of these jobs



THIS cable drum was gated into light flange and away from machined metal inserts to avoid hot spots and simplify heading.

are illustrated herewith. Excellent results were obtained by using the gating and heading methods shown.

The author wishes to express his appreciation to William Kunz and Hugh Coshow for their assistance in preparing this report.

PRE-FINISHED CLAD ALUMINUM

ON the market for the first time, and of considerable interest to various branches of industry are two new pre-finished bonded metals which combine the attraction and durability of nickel and chromium with the lightness, strength and workability of aluminum. These two plated metals are nickel-aluminum and chromium-aluminum, recently introduced by the manufacturer, American Nickeloid Co., Peru, Ill.

These two metals are formed by a surface of chromium or nickel bonded by an electrolytic process to an aluminum base metal, using the Krome Alume process patent No. 1,971,761.

As the result of exhaustive tests conducted over a period of four years, the American Nickeloid Co., states that the process produces coatings that can be fabricated with positive assurance that they will not peel.

One interesting test of adhesion is made by soldering two pieces of nickel-aluminum together, then pulling or twisting the joints. It is claimed that in every case the solder ruptures and with no indication of peeling of the nickel coating.

Because the aluminum does not have to be etched to secure a bond, the luster of the plated surface is not dulled. This, in addition to poor adhesion, has been the fault with several previous attempts to plate aluminum by other methods.

Although these two new composite metals have just been introduced, it is stated that a number of manufacturers have cooperated during developmental work. One manufacturer has adopted chromium-aluminum for the top cover of a glass coffee bottle. A prominent stove manufacturer has used the metal for fume vents on gas stoves and several manufacturers of etched nameplates are using the material.

Although the American Nickeloid Co. is not equipped to plate formed parts after fabrication, the process has been used for this purpose in the commercial production of tea kettles fabricated from sheet aluminum and finished in chromium. It is stated that these kettles have been in use for three years with no indication of any peeling.

The two new pre-finished metals are available in sheets in sizes up to 36 x 96 in., in a full range of tempers, and in gages from 0.010 in. up to 0.064 in. A choice of bright or satin finish and striped, crimped, or corrugated patterns adapts the metals to many uses and designs.

The manufacturer reports that both metals are easily workable during the manufacturing process, and are highly resistant to corrosion, rust, or tarnish. It is also claimed that they can be bent, stamped or moderately drawn without damage to the permanently bonded coatings.

THESE articles are made of composite metals, either nickel-aluminum or chromium-aluminum.

Grinding of HARDENED GEARS

o o o

By JOHN C. DIXON

Engineer, Pratt & Whitney, Division Niles-Bement-Pond Co., West Hartford, Conn.

o o o

ADVANTAGES of hardened alloy steel gears, and the role of grinding in assuring the high accuracy of tooth contour necessary for maximum strength and operating quietness are here outlined. Gear tooth grinders of generating and form-wheel types are illustrated and data are given on the preparation of gears for tooth grinding. The second part, to appear in an early issue, is devoted to methods of mounting the work, and the grinding wheels and types of coolant employed. These articles are from a paper presented by Mr. Dixon at the recent 22nd semi-annual meeting of the American Gear Manufacturers Association.

PRESENT-DAY requirements in the aircraft, automotive and machine tool industries for gears of extreme accuracy and long life, capable of smoothly transmitting increased horsepower, have necessitated the use of hardened steel gears with ground tooth profiles.

Use of hardened steel gears with their increased physical properties has permitted the designer to use gears of narrow face and fine pitch, and lighter construction. This has resulted in gear trains capable of transmitting much greater power without increasing the size of the gear box necessary to house them. It is easy to imagine how much larger our modern machines would be if soft steel or cast iron gears were still used, and how much more floor space would be required to accommodate them.

The aircraft engine with its requirements of minimum weight per horsepower has necessitated use of gears of extremely light construction and in order to use such gears, hardened alloy steels had to be used to get the necessary physical properties.

While hardened steels take care of the physical properties required, this in itself is not sufficient. It is necessary to uniformly distribute the load on the gear teeth, and this requires removing inaccuracies in cutting and distortion due to heat treatment. We believe that the elimination of errors can best be accomplished by grinding the gear tooth profile. The accuracy of tooth spacing and profile produced by grinding makes for smoother operation, produces gears which are much quieter running, and also permits use of high tooth speeds which could not be considered with unground gear teeth.

Since the Lewis paper on strength of gear teeth, which included gear tooth forms as a factor in the strength formula, was prepared in 1892, much has been written on the subject. The A.S.M.E. committee on the strength of gear teeth went so far as to develop a test machine, and in its reports were

o o o

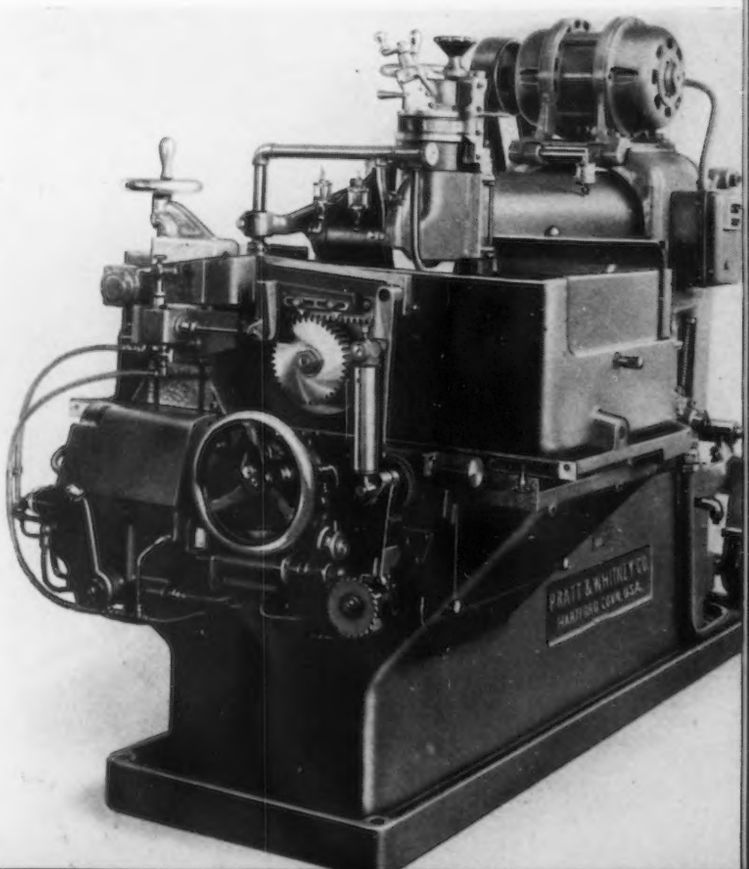


FIG. 1—Pratt & Whitney single-wheel gear tooth grinder for spur gears up to 10 in. in diameter. These machines have a reciprocating grinding wheelhead and a work-holding table actuated by a master rack and gear.

o o o

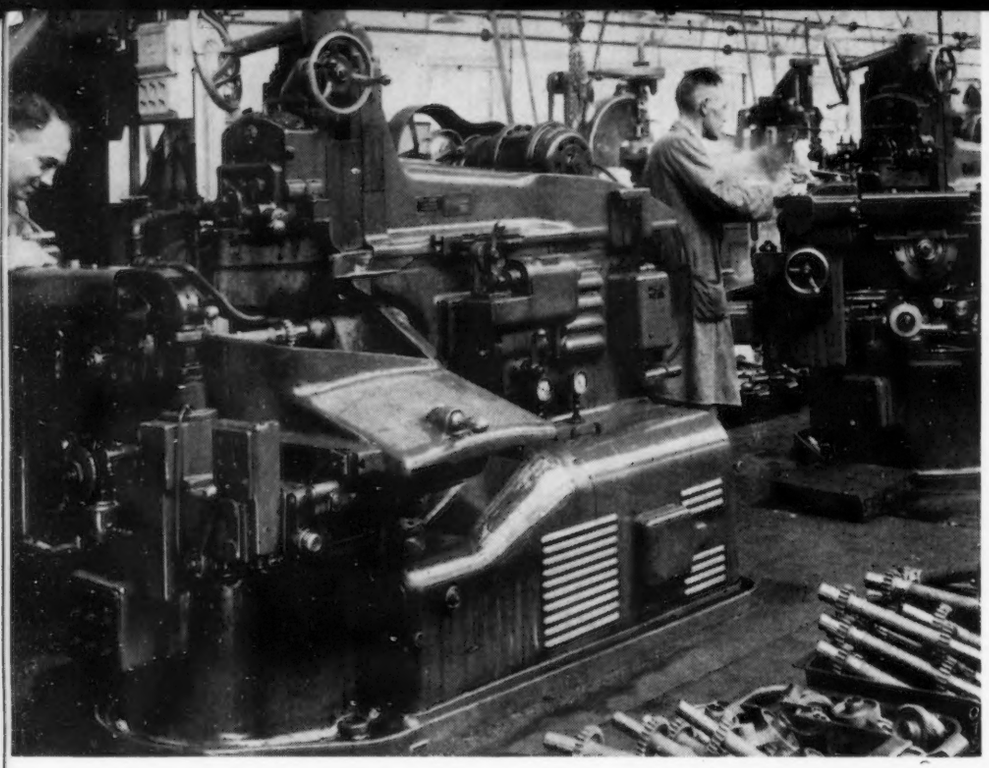


FIG. 2 — Single-wheel Pratt & Whitney machines, also of reciprocating wheelhead type, for helical gears up to 10 in. in diameter.

included findings as to the effect of tooth form and spacing accuracy on dynamic loads. These tests have shown conclusively that accuracy has a marked effect on the load carrying ability of gear teeth, and errors of as little as a few ten thousandths difference from one another result in load carrying losses that are enormous.

The effect of accuracy of gear teeth on noise has also been given intensive study, and writings on the subject have appeared in various trade and technical papers. In the Feb. 7, 1938, issue of *Steel*, for example, S. O. Bjornberg, consulting engineer, Illinois Tool Works, Chicago, pointed out that accuracy in gear teeth is the real answer to quietness. Mr. Bjornberg further stated that it is interesting to note that when a pair of gears are ground accurately, they run more quietly under actual operating conditions than any other class of gear, and when noise does occur the trouble can generally be traced to the design of the gear bearings and housing.

When we grind the tooth profiles we find that it is no longer necessary to spend the time required to accurately cut or hob the gears. The finish cut can be eliminated.

It is no longer necessary to use non-deforming steels or specialized heat treatment to eliminate distortion.

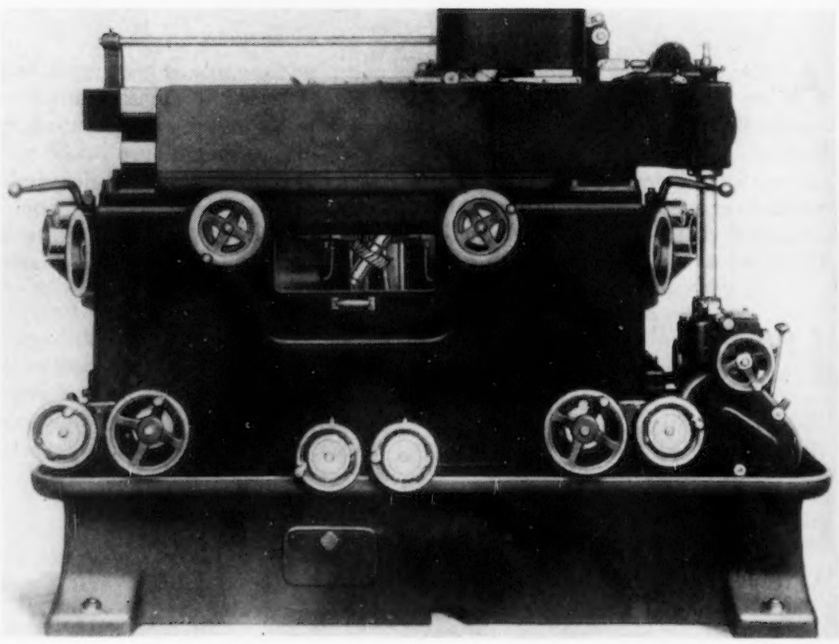
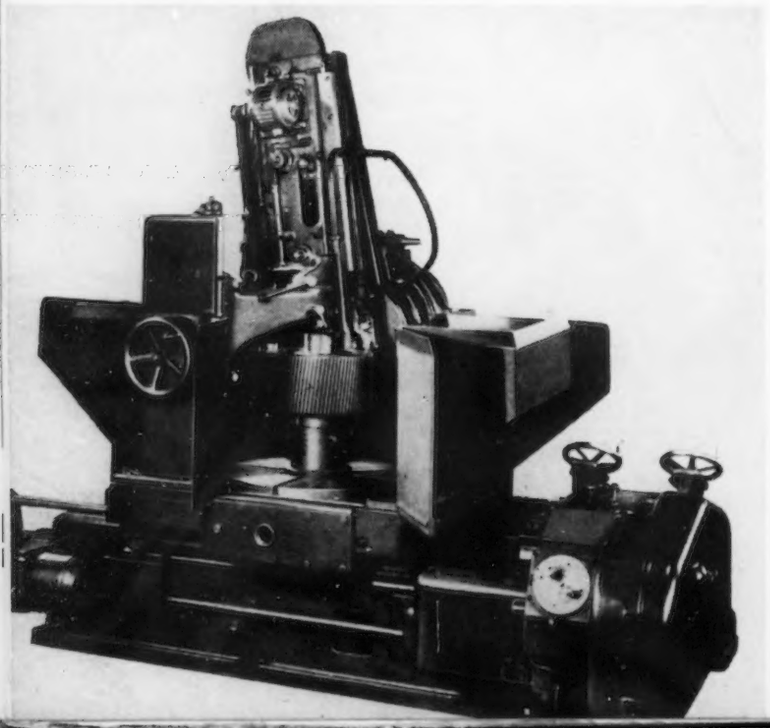


FIG. 3—Deutsch Niles machine, another generating-type, reciprocating wheelhead gear grinder.



ABOVE

FIG. 4—In the Lees-Bradner gear grinder the workslide is actuated by a master rack and gear for generating and index.

Trouble on the test stand is practically eliminated. Expensive disassembly and reassembly of the gear box with its consequent delays is not experienced.

The savings enumerated in the above three paragraphs cover generally the cost of gear tooth grinding. As a matter of fact we are told by leading machine tool manufacturers that their present ground-tooth gears cost less than their previously unground-tooth gears.

While the chief users of gears with ground teeth are aircraft, automotive, machine tool, diesel engine, and turbine manufacturers, such gears are also being used in tractors and marine engines.

The increased use of ground gear tooth profiles has brought the development of gear grinding machines and equipment to their present state of high perfection.

Two different types of tooth grinding machines are now being manufactured. These are the generating type and the form wheel type. In the generating type field several different methods are used to produce the tooth profile. The methods used by some of the gear tooth grinder manufacturers follow:

The Pratt & Whitney single-wheel machines for gears up to 10 in. in diameter, embody a reciprocating grinding wheel head and a workholding table actuated by a master rack and gear, which take care of generating the involute and the index as well. (Figs. 1 and 2.) The Pratt & Whitney single-wheel gear grinder for gears up to 30 in. in diameter has a reciprocating grinding wheel head, and a workslide actuated by gearing for generating the involute, and an index for tooth spacing.

The Deutsch Niles machine (Fig. 3) has a reciprocating grinding wheel head and a workbase actuated by gearing for generating the involute and index device for spacing.

The Lees-Bradner machine (Figs. 4 and 5) has a non-reciprocating grinding wheel head and a workslide actuated by master rack and gear for generating and index.

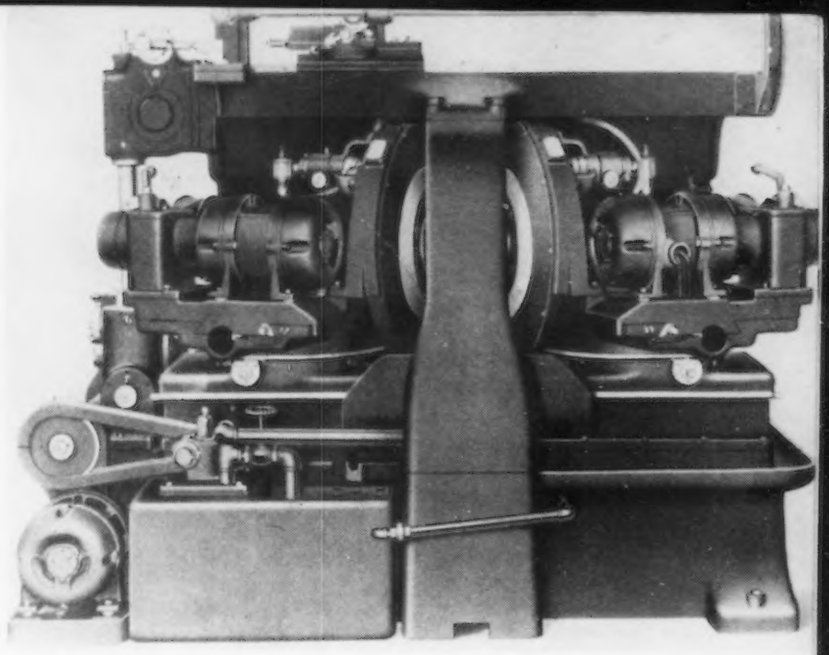
The Pratt & Whitney two-wheel machine (Figs. 6 and 7) has a non-reciprocating grinding wheel head and a workslide actuated by a master rack and gear for generating and index.

The Maag machine has a non-reciprocating grinding wheel head with a feeding workslide actuated by gearing and uses a pitch drum to generate

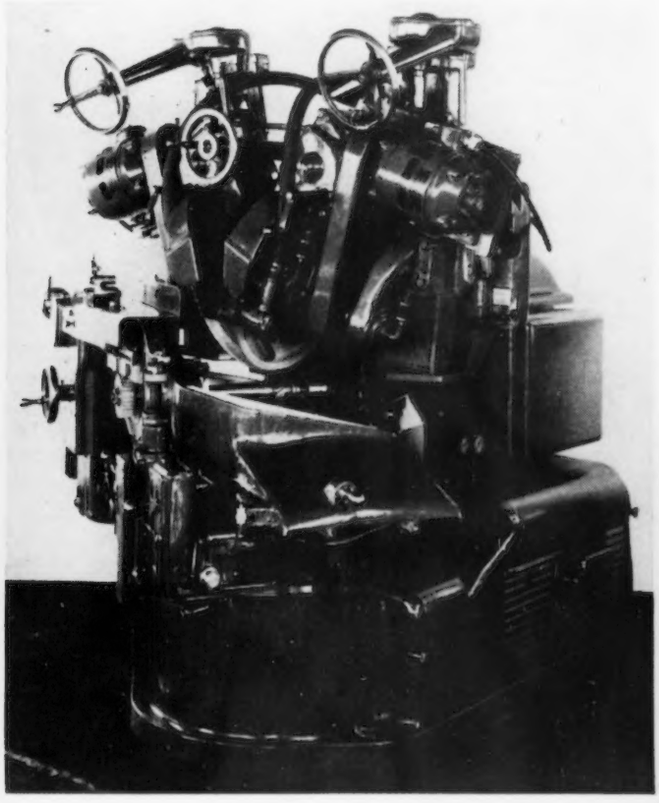
o o o

AT RIGHT

FIG. 5 — Rear view of Lees-Bradner gear grinder showing wheelslides.



o o o

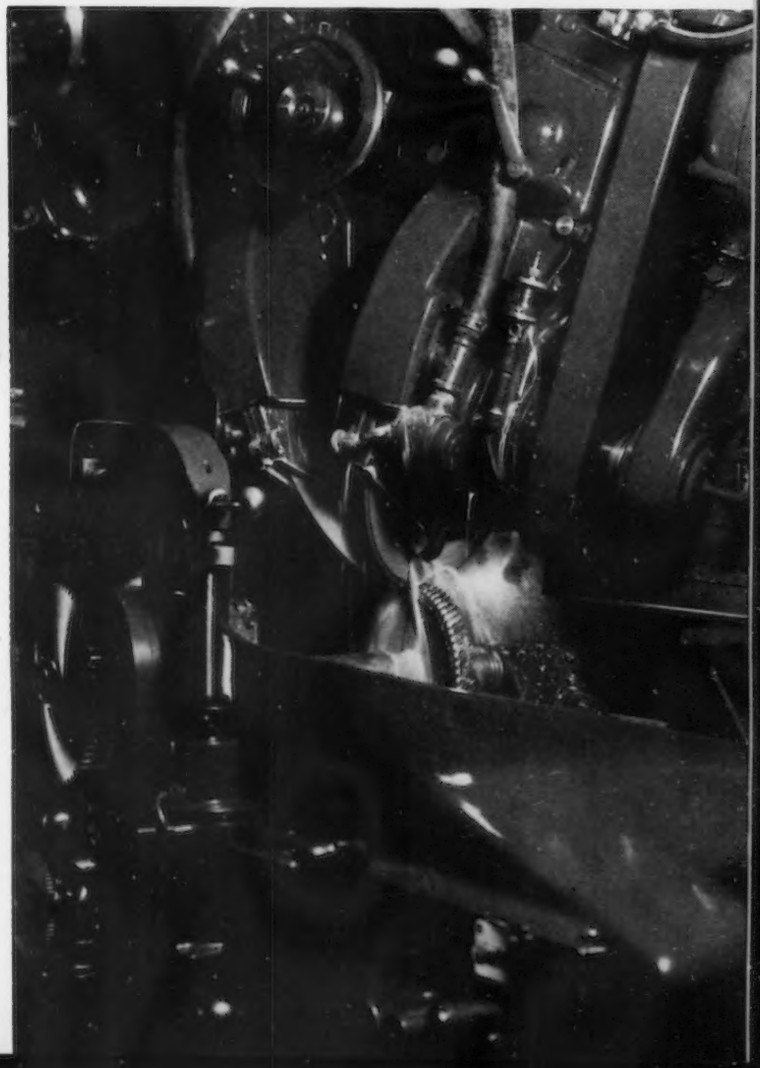


o o o

AT LEFT

FIG. 6—Two-wheel Pratt & Whitney gear grinder, also of non-reciprocating wheelhead type.

o o o



o o o

AT RIGHT

FIG. 7—Close-up of Pratt & Whitney two-wheel machine in operation on the teeth of a helical gear.

o o o

the involute and an index plate for spacing. (Fig. 8.)

In the form-wheel type machines, such as the Detroit (Fig. 9) and the Orcutt Birmingham (Fig. 10) a truing device for forming the wheel and an index plate are used.

The sequence of operations for the ground-tooth gear should be arranged to provide proper surfaces for locating and holding the gear during the tooth grinding.

Gears to be mounted on arbors should have the bore ground to a uniform size, and the locating surfaces must be in correct relation with the bore. On gears that are bushed, such as idler gears, the bushing should be in place and properly bored.

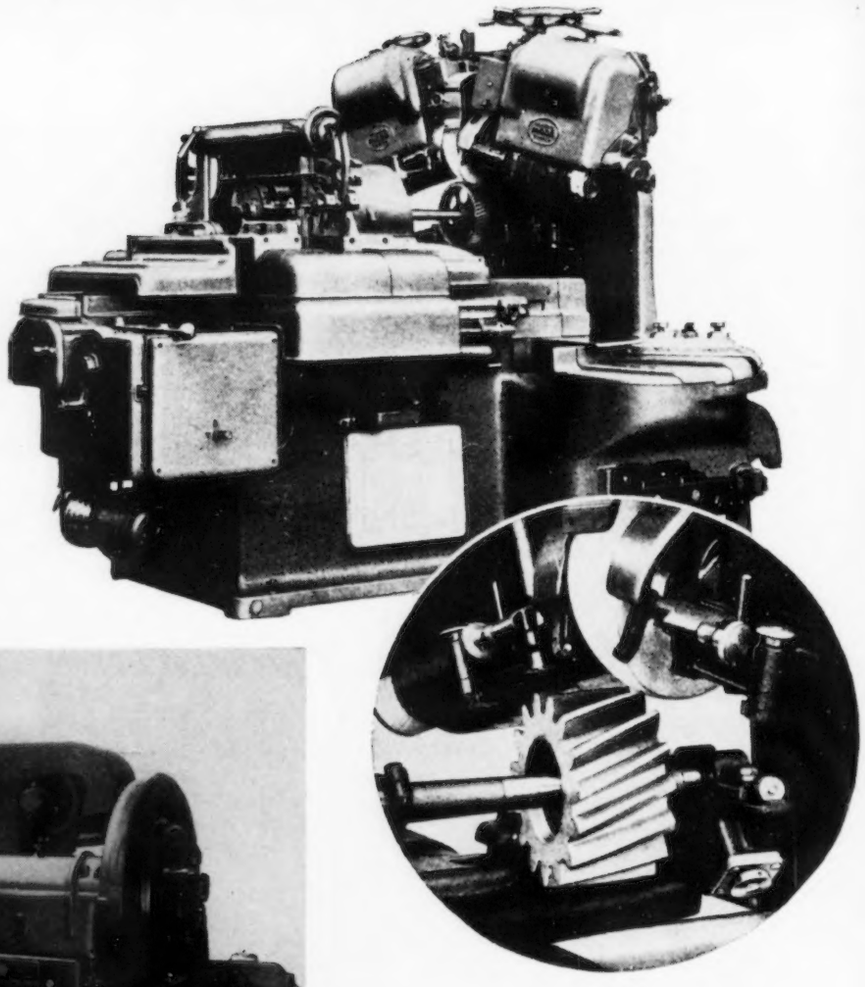
Gears having external mounting requirements should be uniformly ground on their bearing diameters.

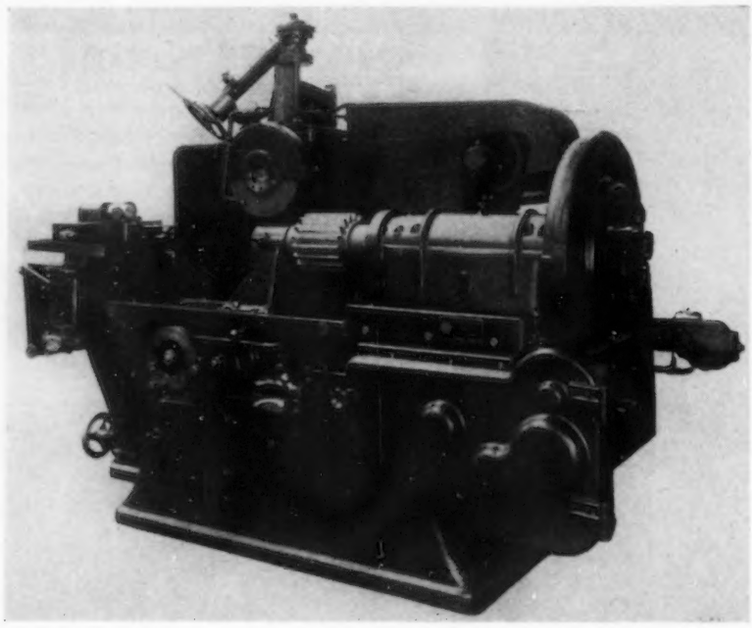
Gears which are to be ground by mounting them on centers must be provided with centers of adequate bearing or support dimensions.

The hob or cutter should be of such dimensions as to leave 0.005-0.007 in. stock to be removed by grinding from each side of the tooth. This should be sufficient to take care of heat treat distortion and cutting irregularities on gears up to 6 or 7 in. For gears of larger diameter additional stock should be allowed.

Unless it is imperative to grind the tooth at the root, the hob or cutter should be of sufficient addendum length to leave wheel clearance at that point.

(To be concluded)





ABOVE

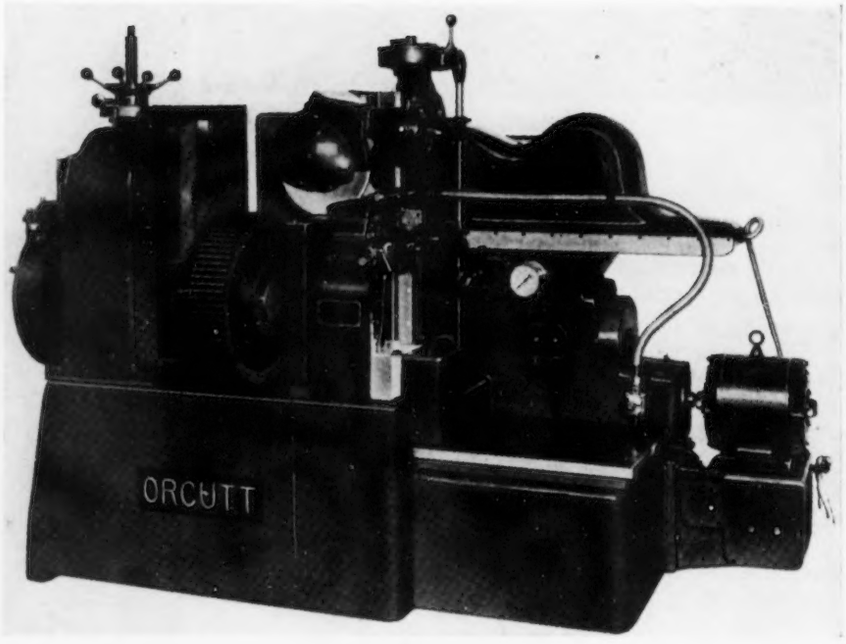
FIG. 8—In the Maag gear grinder a pitch drum generates the involute and an index plate is used for spacing.

AT LEFT

FIG. 9—Detroit 24-in. diameter gear grinder, a form-wheel type unit built by the Gear Grinding Machine Co.

BELOW

FIG. 10—Orcutt Birmingham gear tooth grinder, another form-wheel type machine.



ELECTRIC OVEN AIDS BICYCLE PRODUCTION

By T. A. DRISCOLL
Cleveland Electric Illuminating Co., Cleveland

FOR many years the Cleveland Welding Co. had made welded assemblies consisting primarily of automobile wheels, rims, truck wheels and similar articles. With the return of the popularity of the bicycle the company realized that its plant was ideally equipped for the manufacture of completed bicycles, and for the manufacture of steel chairs—a market that developed at about the same time.

In the manufacture of the other assemblies the company had experienced with the various types of enamels and had been using electric batch ovens for baking this finish.

Upon investigating the possibilities of bicycle production the company realized that it would have to use the continuous oven, and also that it would have to do considerable experimental work in determining the lacquers, temperatures, and baking times to produce a finish with lots of "sales appeal." Uniform appearance in colors was also an important requirement as the bicycles would be displayed in groups and the red or black bicycles turned out today must match the reds or blacks produced weeks or months before.

After determining the production desired, a suitable type oven was tentatively discussed. Electric heat was decided upon because of the consistently uniform production and appearance obtainable. Finally a double-chamber continuous "A" type, heat-seal unit, one of the most efficient constructions for a continuous oven, was secured from another Cleveland plant which had discontinued a line of automotive head lamps. This oven, originally built by the Young Brothers Co., Detroit, was revamped and set up by the same company for the handling of the bicycle frames and parts.

The oven as installed in the plant of the Cleveland Welding Co. is shown in the accompanying illustration. The work is loaded on the overhead monorail conveyor and is carried to the mouth of the oven. It then starts its travel through an inclined preheat, emerging from the preheat at the top of the incline into the firing chamber proper. It then passes through the firing chamber at a predetermined rate of speed giving the required time for baking, and then is allowed a relatively slow cool by passing down the incline at the opposite end of the oven. This preheat and relatively slow cool eliminate the thermal shocks frequently experienced on lacquered work, and give a much better finish.

The monorail which traverses the furnace also extends around an assembly area outside the furnace, eliminating handling and allowing the work to be loaded and unloaded at the various assembly points.

The double chamber in the oven actually gives the advantages of two ovens, which means that different speeds and different temperatures can be run in each part of the oven, thus eliminating the necessity for storing the parts while the oven is baking the lacquer on the part that requires the longer or shorter time, or the higher or lower heat.

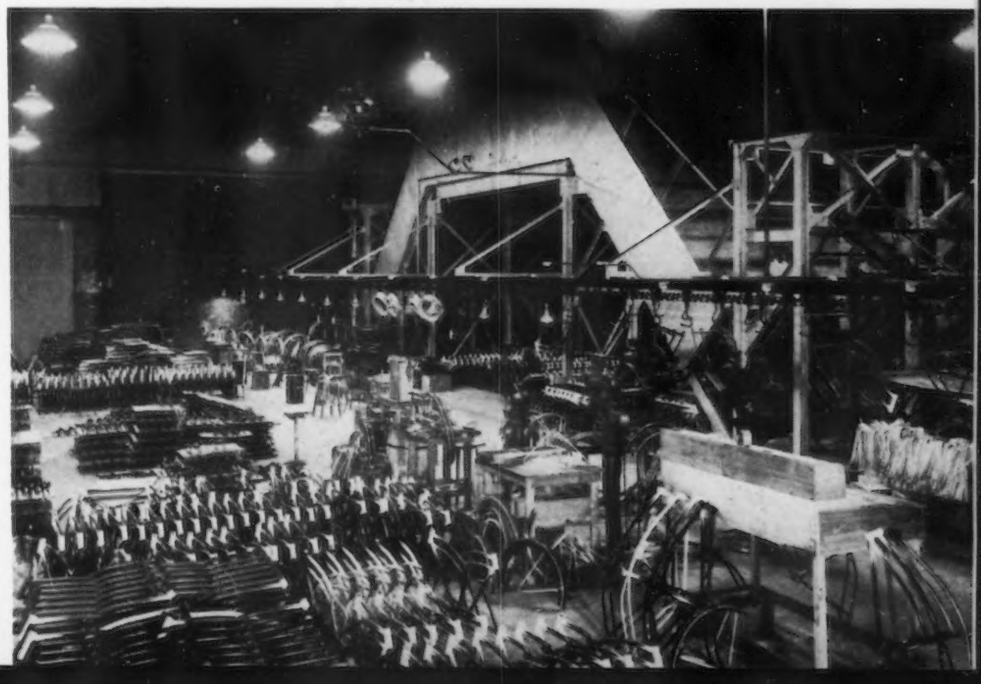
The oven is heated with General Electric oven-type heaters having a connected load of 250 kw. equally divided between the two sections of the oven, and in each half of the oven the heat is divided into two separate control zones, thus assuring uniformity of temperature throughout the length of travel. These temperature-control instruments are set for the desired temperature and automatically control the power input to each zone of the heating chamber in accordance with the requirements of that zone.

After the work has been unloaded from the monorail any necessary striping is done by hand and the parts are hung back on the conveyor hooks, where they are thoroughly dried on their way to the assembly department.

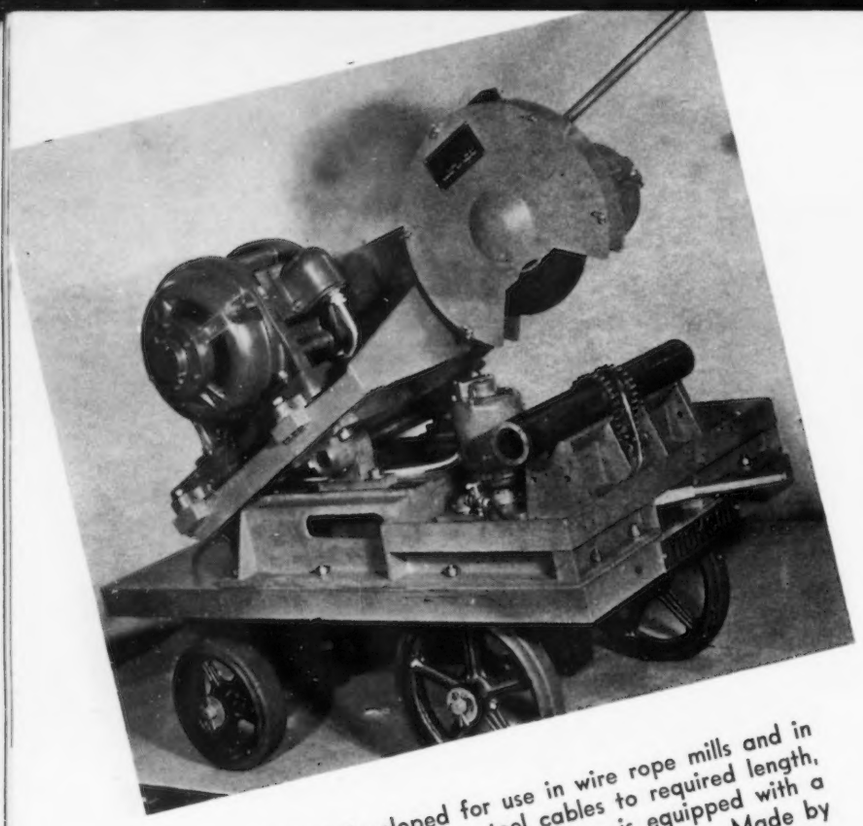
To assure work of maximum quality, the area surrounding the oven, which comprises the dipping, draining, striping and some assembly work, is illuminated by high intensity lighting without glare or shadows.

This installation shows the many possibilities of small heating units as applied to major production jobs. By distributing many small heaters in the furnace, very satisfactory temperature distribution is obtained. In addition to producing excellent work, this electric oven has proved economical in operation.

DOUBLE-CHAMBER, continuous "A" type electric oven used by the Cleveland Welding Co., Cleveland, for baking the lacquered finish on frames and other parts of bicycles. The work is carried through a preheat into the firing chamber at the top, and is cooled in passing down the incline at the opposite end of the furnace. Photo by courtesy General Electric Co.



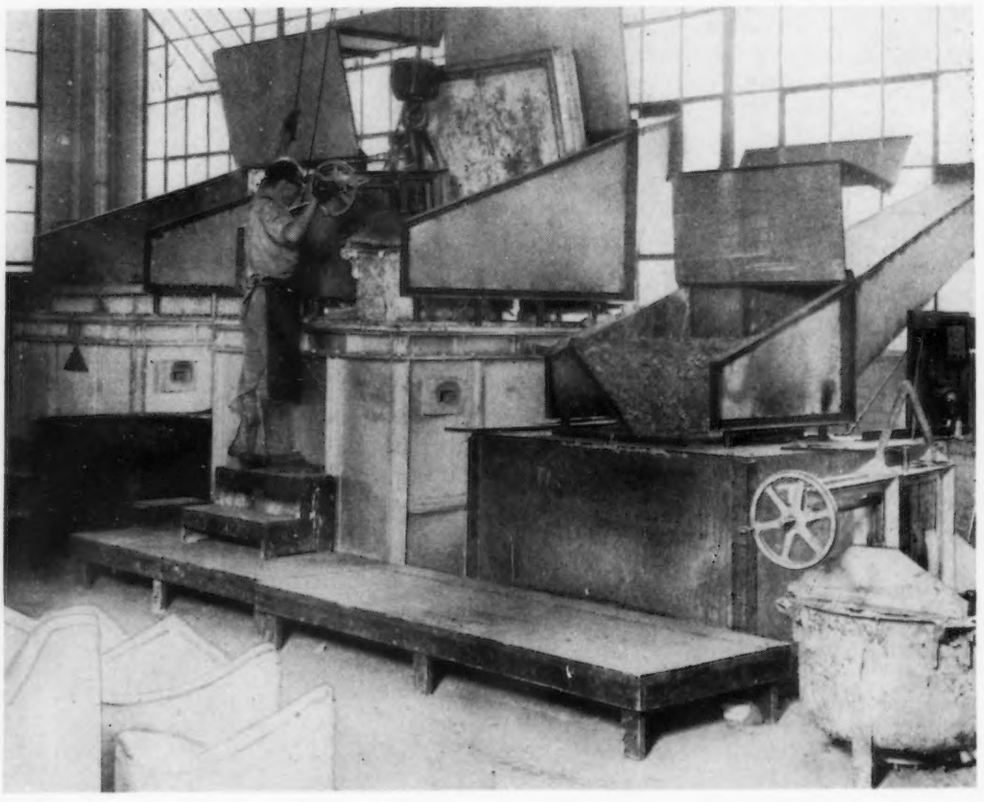
What's



ESPECIALLY developed for use in wire rope mills and in warehouses for cutting steel cables to required length, this portable abrasive cut-off machine is equipped with a 20-hp. motor and a motor-driven coolant pump. Made by Thomson-Judd Wire Machinery Co., Lynn, Mass., this machine will cut wire rope up to 3 in. in diameter, and also will handle all kinds of steel shapes as well as pipe and tubing.

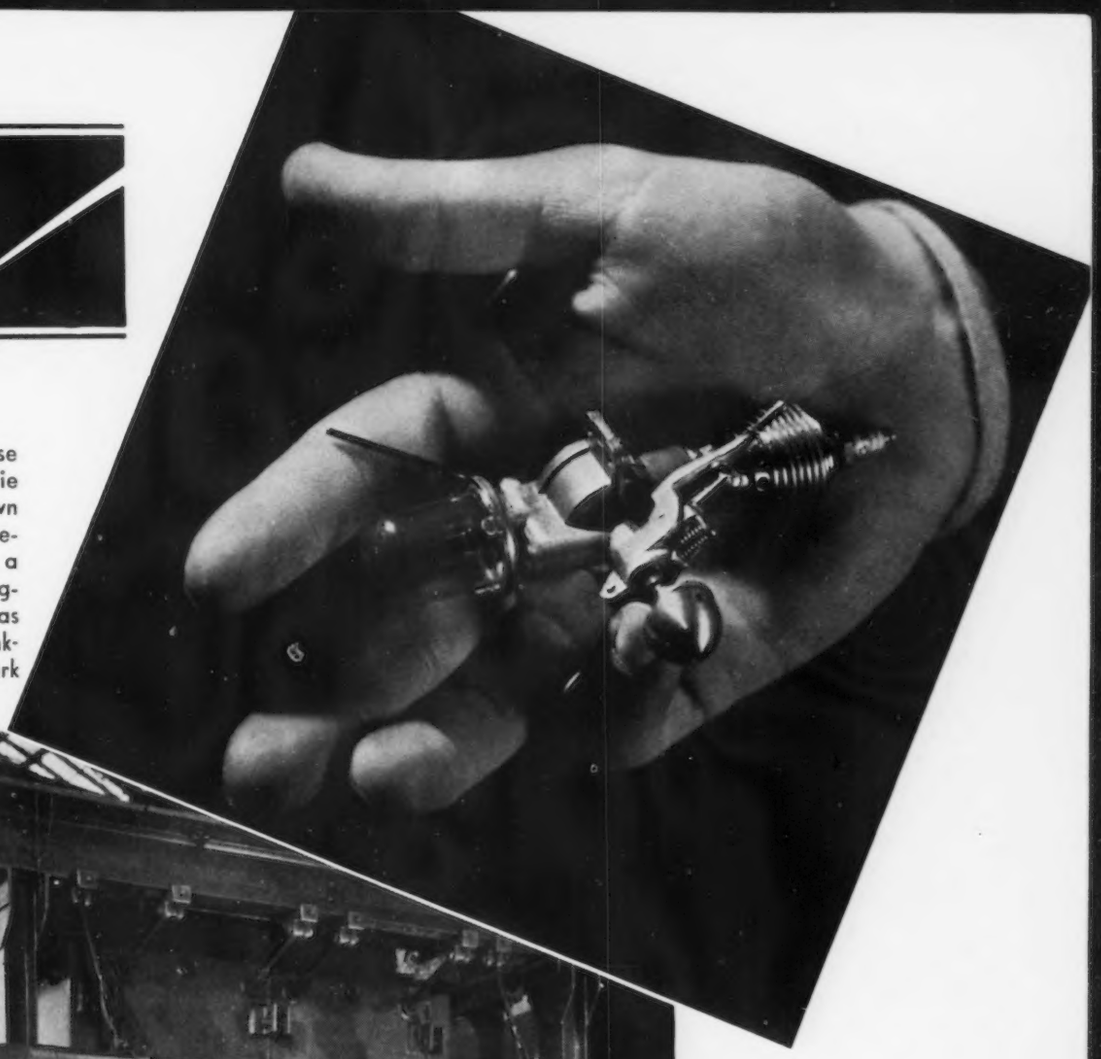
BELOW

THE Flex-Seal is a new kind of stainless steel cooker made by Vischer Products Co., Chicago, using Armco steel. A so-called "sorbheet" bottom permits the use of high heat without danger of hot-spotting, when little or no water is used. A patented flexible stainless steel lid is locked in place by steam pressure—the cooker cannot be opened until all the pressure is released.



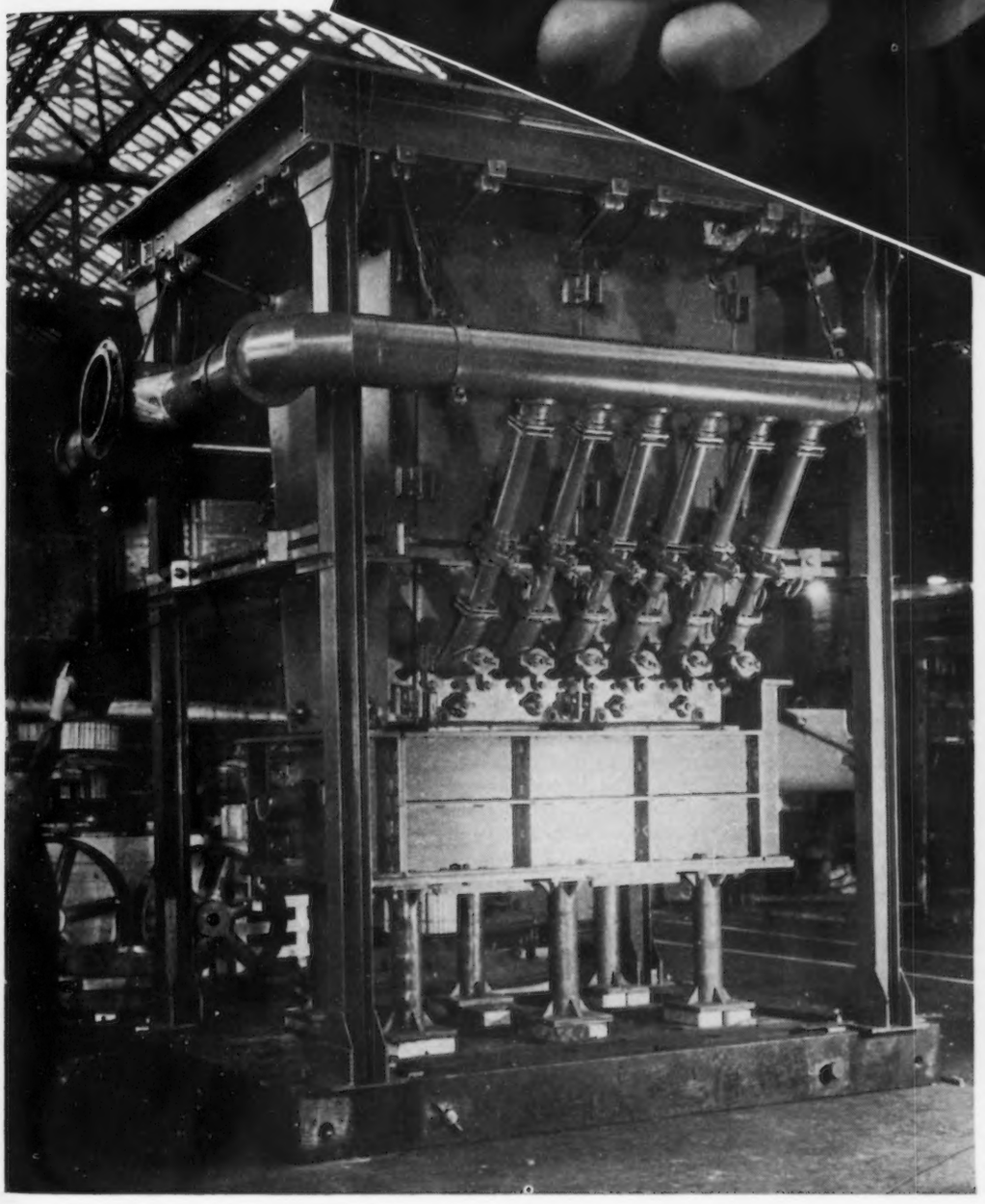
THIS new furnace for melting zinc was recently perfected by the technical staff of the Glenn L. Martin Co., Baltimore airplane manufacturer. The new unit, which is said to eliminate both the heat concentration and erosion of metal pots typical of older type furnaces, has been in steady use for more than a year with no signs of deterioration. An inner pot is suspended in a mass of molten lead or other metal or metallic alloy, having a lower melting point than the zinc, which transfers heat to the pot containing the zinc. The photo shows the inner pot or container being removed for examination.

New!



AT RIGHT

THIS tiny Atom engine makes use of three Mazlo magnesium die castings to bring its weight down to a scant 2 oz. The engine develops 1/8 hp. and will operate a "giant" 2-lb. model airplane. Magnesium, weighing one-fourth as much as steel, is used for the crankcase, crankcase cover, and spark advance lever.



o o o

ABOUT 100 tons of copper is smelted daily in this small blast furnace, which was recently built for shipment to Africa by the mining division of Allis-Chalmers Mfg. Co., Milwaukee. The copper produced is later refined in a converter. For many years in this country, copper has been reduced in reverberatory or brick kiln type furnaces, often quite large.

o o o

METALLURGISTS REPORT

WITH the greatest membership in its history—well over 10,000 exclusive of over 3700 student associates—and an extensive and varied technical program, last week's 152nd annual meeting of the American Institute of Mining and Metallurgical Engineers at New York drew a record attendance of 2800 metallurgists and engineers.

The Monday afternoon All-Institute meeting heard Merlin H. Aylesworth, former president of National Broadcasting Co., and Lt. Col. L. A. Codd, executive secretary, Army Ordinance Association, Washington, discuss subjects of vital importance to American industry and defense. Mr. Aylesworth spoke on "The Future of American Industry," and Col. Codd discussed "Industry and Defense."

New officers of the A.I.M.E. also were introduced at the All-Institute meeting. Frank T. Sisco, editor of the Alloys of Iron Research of the Engineering Foundation, New York, was elected chairman of the Iron and Steel Division for 1940; and Edmund M. Wise, staff advisor of the research laboratories, International Nickel Co., Inc., was elected chairman of the Institute of Metals Division for 1940.

On Wednesday afternoon Edgar Hutton Dix, Jr., chief metallurgist, Aluminum Co. of America, delivered the 19th annual Institute of Metals Division lecture, on the subject of "Acceleration of Rate of Corrosion by High Constant Stresses."

On Thursday afternoon, Charles H. Herty, Jr., of the research development department of the Bethlehem Steel Co., delivered the 17th Howe Memorial Lecture, his subject being "Slag Control."

A number of medals and honors of the Institute were presented at the annual banquet at the Waldorf-Astoria, Wednesday evening, Feb. 14.

The James Douglas Medal went to Louis Davidson Ricketts, "for inspirational leadership and distinguished achievements in the metallurgy of copper."

The Robert W. Hunt Medal for 1940 was awarded to Axel Hultgren, professor of metallography, K. Tekniska Hogskolan, and Gösta Phragmén, Metallografiska Institutet, both of Stockholm, Sweden, for their paper entitled "Solidification of Rimming-steel Ingots."

A certificate of Honorary Membership was presented to Henry Krumb, vice-president of the Institute for the last 12 years.

Herbert G. Moulton was introduced as president of the Institute for 1940.

The J. E. Johnson, Jr., Award was presented to P. V. Martin, assistant division superintendent, coke plant and blast furnaces, Carnegie-Illinois Steel Corp., Gary, Ind., for his research on the "Effect of the Solution-loss Reaction on Blast-furnace Efficiency."

The Institute of Metals Division award went to Alden B. Greninger, assistant professor of metallurgy, graduate school of engineering, Harvard University, for his paper, "The Martensite Transformation in Beta Copper-aluminum Alloys."

METAL POWDERS

Effect of Time, Temperature and Pressure on Density

A MOST interesting paper presented in the Recrystallization Session, Wednesday morning, was that dealing with the effect of time, temperature and pressure upon the density of sintered metal powders, prepared by F. C. Kelley, of the research laboratories of the General Electric Co.

First, dealing with the effect of pressure in the sintering of iron, Mr. Kelley pointed out that it is well known that it is possible to produce pressed bars of metal powders with cracks at right angles to the direction of pressing, and that even high pressures serve only to exaggerate this condition which results in materials of low density. It may be due to several causes, such as particle size, shape and thickness of the article to be pressed, the rate of work-hardening of the powdered metal, etc. It is also known that there are many things which may be done to overcome the difficulties, such as introducing a lubricant which will allow the particles to flow more easily, or changing the design of the mold so that it may be pressed from two directions instead of one.

The metal powders investigated were all —200 mesh with about 50 per cent of them —325 mesh, and all are available commercially.

Seven samples were pressed at 10 to 70 tons per sq. in. with a 10 ton variation between each. They were all sintered together in hydrogen on an iron boat covered lightly with Al_2O_3 to prevent sticking at a temperature of 2600 to 2640 deg. F. for 32 hr. The results of density measurements are as follows:

Pressure, Lb. Per Sq. In.	Density
140,000	7.809
120,000	7.824
100,000	7.830
80,000	7.814
60,000	7.836
40,000	7.816
20,000	7.775

It is quite evident that pressure has only a slight effect upon the final den-

sity, but pressures of 30 to 60 tons per sq. in. give the highest densities.

In order to determine the effect of temperature, a second series of samples was pressed at 30 tons per sq. in. and sintered at various temperatures for 32 hr. in hydrogen. The density measurements were as follows:

Temperature, Deg. C.	Density
800	6.96
1000	7.08
1200	7.38
1300	7.433
1350	7.45
1400	7.80
1425-1450	7.725

This series shows very convincingly the importance of temperature in bringing about the maximum amount of sintering. The critical temperature for sintering lies between 1350 and 1400 deg. C. (2460 to 2550 deg. F.), for here is where the greatest increase in density occurs. Sample No. 7 for some unknown reason has a lower density than No. 6 in spite of the higher temperature of sintering.

A third series was pressed at 30 tons per sq. in. and sintered for various lengths of time at 2600 to 2640 deg. F. The results were as follows:

Time	Density
1 hr.	7.5
2 hr.	7.55
4 hr.	7.67
8 hr.	7.658
16 hr.	7.77
32 hr.	7.807
64 hr.	7.859

The effect of time on sintering is not as important as temperature, but it is nevertheless a very important factor when maximum density is desired. The data indicate that pure powdered iron, when pressed at 30 tons per sq. in., must be sintered for about 64 hr. at 1425 to 1450 deg. C. (2600 to 2640 deg. F.) to obtain the theoretical density of 7.86. Here again there is one sample which is out of line, even though all samples were pressed at the same pressure and sintered all together in the same furnace at the same temperature. An average of several samples would probably give a more representative curve.

Similar studies have been made for the sintering of cobalt, nickel and Fernico (18.5 Co, 28.5 Ni, and 53 Fe). The conclusions reached by Mr. Kelley for the entire study were as follows:

(1) Pressure is the least important factor in sintering of the pure metals Fe, Co, and Ni, but there seems to be an optimum pressure range which gives maximum density when sintered at the temperatures indicated.

(2) Temperature is the most important factor in bringing about maximum sintering.

(3) Time at a particular temperature is also an important factor in bringing about maximum sintering.

(4) It is possible to produce objects from pressed and sintered metal powders, such as Fe, Co, and Ni, which have densities equal to those given for the elements.

(5) There is some indication that diffusion may play a part in bringing about maximum sintering in the case of Fernico.

(6) The conclusions drawn apply, in general, to pure metals and not to alloys, as there are other factors which may be of importance in the case of alloys, such as rate of diffusion or formation of compounds.

SURFACE QUALITY

Rolled Steel Surface Dependent Upon Mold-Wall Surface

A SECOND Wednesday morning session of the Iron and Steel Division dealt with the control of surface qualities of steel. One informative paper in this group, by T. J. Woods, of the Republic Steel Corp., worked out a relation of billet or bloom surface with mold-wall surface.

Mr. Woods' paper dealt with the relation of ingot surface and subsurface defects, such as, blow holes, cracks, etc., present on the average ingot, to the defects found on the direct rolled product, billets and blooms. By direct rolled is meant, there was no intermediate heating between the breakdown of the ingot and the finished billet or bloom.

The results indicate that aside from rolling defects, such as laps, collaring, etc., the ingot surface is responsible for practically all other defects which appear on the rolled product.

The experiments described by Mr. Woods were conducted on hot topped, medium carbon and alloy steels strongly deoxidized to produce fine McQuaid-Ehn grain size. They were made in basic open-hearth furnaces of 100 tons capacity.

The results of surface experiments conducted before mold life was taken into consideration were not reliable. In no two similar experiments would the same answer be obtained. This was particularly true when different kinds of mold coatings were tried.

Of the numerous factors which have a direct bearing on the surface of a rolled product, the difference in mold life was found to be the fundamental factor.

The following experiments were conducted over a period of time, and the results are definite enough to answer the time worn question: "Who is

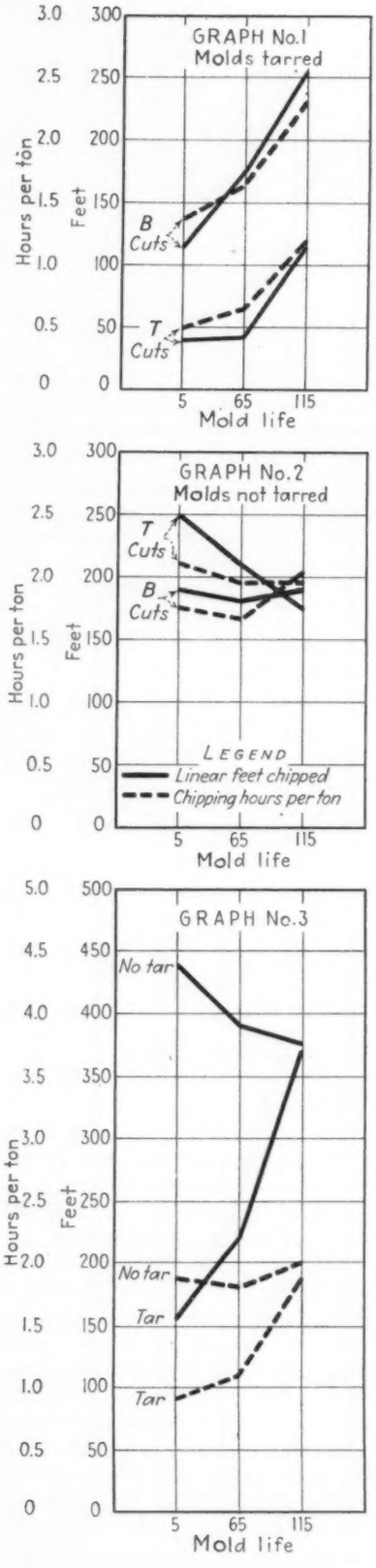


FIG. 1—Relation of surface defects of steel to mold life. Graph No. 1—comparison of top and bottom cuts from tarred molds vs. mold life. Graph No. 2—comparison of top and bottom cuts from molds not tarred vs. mold life. Graph No. 3—comparison of molds tarred and not tarred (top and bottom cuts combined) vs. mold life.

responsible for the defects, blooming mill or open hearth?"

Graphs Nos. 1, 2 and 3 in Fig. 1 represent the condensed results of one entire heat of SAE 1045, fine grain, hot topped, killed steel. The mold set was comprised of 36 molds consisting of:

(a) Twelve molds—5 heat life.
(b) Twelve molds—65 heat life.
(c) Twelve molds—115 heat life.

They were spaced in groups of three according to life from the front to back end of the set. Alternate groups were tar sprayed when the outside mold walls were at a temperature of 150 deg. F. The intervening groups were not tar sprayed—they were uncoated. Just before being poured into, all molds were siphoned to remove all dirt. All ingots were poured by the same worker who had been instructed to do a uniform job, that is to open up and pour with the same speed throughout.

The entire heat after standing 1 hr. and 15 min. from the time the last ingot was poured, was delivered to the blooming mill and charged into the soaking pits as soon as possible. Six ingots, two from each mold life group, were charged in each of six pits, totaling 36 ingots. Average time in pits was between 5 and 6 hr.

The arrangement of the molds in the set, and the ingots in the soaking pits was done in order to reduce to a minimum the variables due to speed of filling the molds and soaking pit characteristics.

The ingots, 20x20 in., semi-fluted, weighing 7200 lb., were rolled to 6½x5¼ in. blooms, two cuts per ingot. Each bloom was stamped with reference to ingot location, that is top or bottom (T & B), and serial numbers denoting sequence of pouring.

Graphs Nos. 1 and 2 (see Fig. 1) show the relation of the linear feet of defects and time spent in removing them by chipping. This is shown as top and bottom cuts, rolled from ingots poured in molds of varying life, tarred and untarred.

Graph No. 1 in Fig. 1 (tarred molds) shows that as the life of the molds increases, the amount of defects also increase. The increase of defects on the top cuts is not as great from 5 life to 65 as it is from 65 to 115. The bottom cuts, regardless of life, contain a greater number of defects than the top cuts. They also follow the mold life more consistently.

Graph No. 2 in Fig. 1 (untarred molds) reveals the top and bottom cuts to contain more defects in comparison with the product from tarred molds (Graph No. 1), regardless of life, except on the oldest molds (115 life) the bottom cuts contain less defects than when the molds of that life are tarred. The only explanation we can offer for this condition is as follows: Fire checking of the mold walls starts at the extreme bottom and spreads up the center of the sides as life increases. This means the first checking which would be near the bottom progresses in depth with life and when such a mold is tarred, the tar collects in the crevasses which form the fire checked alligator-like skin and react with the metal to form blow holes.

Graph No. 3 in Fig. 1 (top and bottom cuts combined from tarred and untarred molds). These results show the comparison of the amount of defects as judged by the time spent and linear feet of surface removed by chipping, between the product (T and B cuts combined) poured in molds of varying life tarred and untarred. It will be noted the tarred molds produced the better product regardless of life and that as the molds increased in life the benefit of the tar decreased. Mold life had little influence on the product poured in molds not tarred.

Skinned Butts

Skinned butts is a term used to denote the removal of the entire surface due to defects on the rolled product near the bottom end of bottom cuts.

All heats (61) contained in these data were taken from regular production. They were all SAE 1045, fine grain steel, rolled to 6½x5¼ in., two cuts per ingot. All the ingots were charged in the soaking pits top end down in order to avoid contamination with the pit bottoms. This is regular procedure in the Republic plant. Mold life 1 to 5, 6 to 10, etc., were averaged. No heats with life of 16 to 20 or 71 to 75 were available at that time. Total number of billet sides per heat was used as a base in figuring percentages. All these data are graphed in Fig. 2.

The average of skinned butts from 1 life to 60 is approximately 31 per cent compared with approximately 66 per cent from 60 life to 115, an increase of over 100 per cent. This indicates that fire checking becomes more troublesome between 55 and 65 mold life.

Since Republic began keeping mold sets by life, two peculiarities about the product rolled from ingots cast in new molds were noticed. The first heat poured in a new set results in mold

stickers, if all known precautions are not taken, such as grade of steel and its temperature. Grades such as high-carbon should not be among the first few heats poured. Also noticed has been that the rolled product from the first heats poured in new molds up to about 5 life contain longitudinal corner cracks. They are usually located in the bottom half of the bottom cut billet or bloom. When molds are not kept by life these characteristics are not usually noticed on account of new molds being added to the sets in small numbers.

The number of heats cast in a set of molds is not alone in the formation of fire checking. The elapsed time of the ingots in the molds and the elapsed time between pours is very important. The experiments were conducted on mold sets in which the average elapsed time of the ingots in the molds was from 1½ to 2 hr. The time between pours was from 10 to 12 hr. At time of pouring the molds were warm.

Mr. Woods summed up all the data in his paper as follows:

(1) Excluding mill defects, all surface defects present on the rolled product have their origin on or in the ingot.

(2) All other factors being equal, the surface of the rolled product follows directly with mold wall surface or pouring life.

(3) It is believed that all ingots of all heats contain blow holes in varying amounts, near the bottom in particular. The amount, depth and distance up the ingot depending on life of molds and all phases increase with mold life.

(4) The difference in the percentage of skinned butts from heat to heat is due to soaking pit treatment. The original ingot surface which contains blow holes is removed by scaling. Soaking pits differ in their scaling ability as do locations in individual pits. The reason for the lower percentage on ingots cast in lower life molds is due to less scaling being necessary to remove the blow holes which are fewer in number, nearer the surface and lower down the ingot, in some cases so low they are below the rolled product discard.

(5) At some age between 55 and 65 life, the fire checked surface of the mold walls become much more troublesome.

(6) Properly tarred or pitched molds apparently produce a definite improvement in billet or bloom surface as compared with untarred or unpitched molds. The benefit decreases as life of molds increase. At some life between 65 and 100, tar or pitch coatings are a detriment to the bottom end of bottom half.

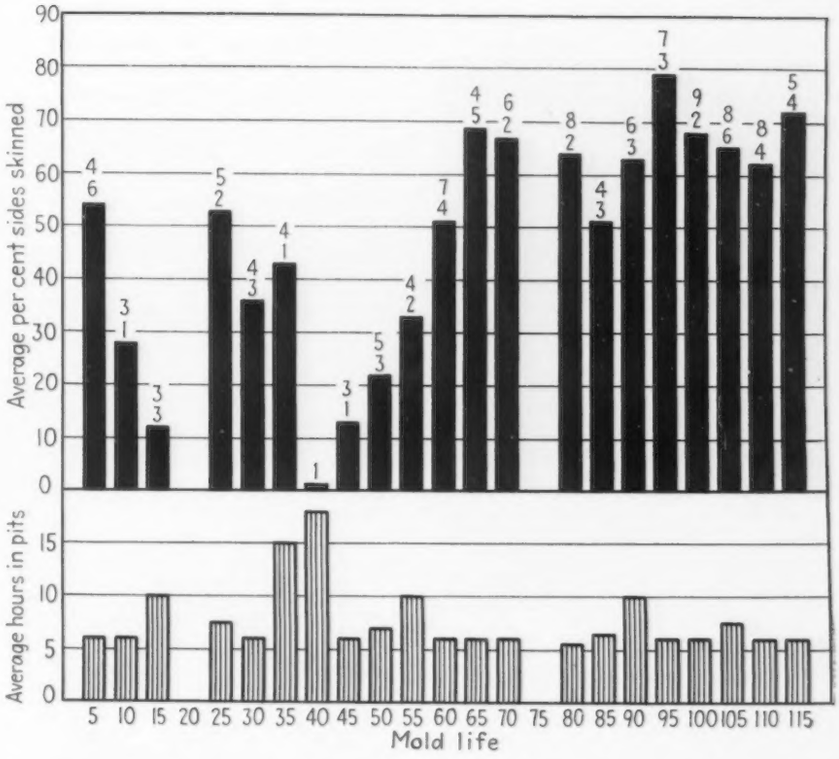


FIG. 2—Per cent skinned butts vs. mold life. Upper figures at head of column indicate average feet skinned. Lower figures indicate number of heats averaged.

STAINLESS STEELS

Effect of Pretreating Temperature on Creep and on Elastic Properties

THE characteristics of austenitic stainless steels were considered in the Thursday afternoon session of the Iron and Steel Division. One paper in this group considered the effect of temperature of pretreatment on creep characteristics of 18-8 stainless steels at 600 deg. to 800 deg. C., and was prepared by C. R. Austin and C. H. Samans, of Pennsylvania State College.

The primary purpose of the investigation was to study the effect of temperature of pretreatment of 18-8 stainless steels on their behavior under tensile deformation at 600 deg., 700 deg. and 800 deg. C.

Considering first the tests at 600 deg. C., for a common time at temperature and set of stress conditions, the authors found that (1) the size of precipitate and (2) the distance from the grain boundaries at which the "cloud-like" precipitate occurred was practically the same for each of the three pretreatments. This indicates, as might be expected, that both the precipitation and the agglomeration are dependent upon test temperature, and are independent of the grain size of the steel. The rate of diffusion of one of the major elements is probably the determining factor.

FRANK T. SISCO
Chairman, Iron and Steel Division

It was shown also that modification of the alloy pretreatment has little effect on creep characteristics.

On testing at 700 deg. C. the amount of grain-boundary precipitate seemed to be about the same for each of the three differently pretreated specimens. The coarse-grained material, however, had much more precipitate within the grains, concentrated largely along internal twin bands. The differences between the two fine-grained materials were slight. Under these conditions it is difficult to explain the results of deformation tests made, except on the basis of the strengthening effect of fine precipitate formed by the 750 deg. pretreatment. A superiority of the steel pretreated at 1150 deg. over that treated at 950 deg. C. is undoubtedly due to its larger grain size, since the two specimens were otherwise in the same initial condition.

Finally, a comparison of the three differently pretreated steels, on testing at 800 deg. C. showed no major difference either in their resistance to deformation or change in microstructure.

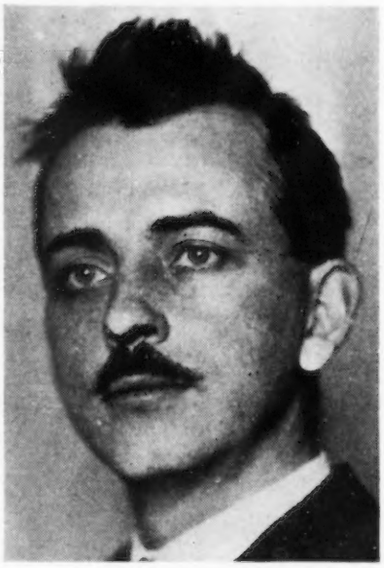
The more important results of the investigation were summarized by the authors as follows:

(1) Confirming the results of previous investigators, an increase in grain size is found to increase the resistance to deformation of 18-8 stainless steels only at the higher test temperatures.

(2) The temperature above which increased grain size becomes effective lies between 600 deg. and 700 deg. C., and is probably associated with progressive recrystallization, as pointed out by White and Clark.

(3) On testing at a temperature below that at which recrystallization becomes effective (600 deg. C.), no evidence has been obtained to show that temperature of pretreatment has any material effect on creep characteristics of the alloy.

(4) Evidence has been presented to indicate that the advantage provided by coarse grains, on testing at 700 deg. C., may be substituted by a heat treatment that results in the formation of a fine precipitate within the fine-grained steel. The strengthening effect of this precipitate appears to persist for at least 2000 hr. Higher test temperatures presumably lead to agglomeration and concomitant decrease in resistance to deformation in 600 to 800 hr.



EDMUND M. WISE
Chairman, Institute of Metals Division

(5) At 600 deg. and 700 deg. C. the precipitation process associated with stainless 18-8 steel is a relatively slow one and apparently proceeds for several thousand hours.

(6) Precipitation seems to occur, preferentially, in the following locations: (*a*) grain boundaries; (*b*) ends of annealing twin bands; (*c*) sides of annealing twin bands; and (*d*) within the grain.

(7) Two types of precipitate occur, one of which is probably carbide while the other, slightly pinkish in color, is probably ferritic in nature.

(8) Neither stress nor the plastic deformation accompanying it, in the range studied, seemed to have any effect on the character of the carbide precipitate.

A SECOND paper in this session dealt with the effects of low-temperature heat treatment on the elastic properties of cold rolled austenitic stainless steels, and was prepared by Russell Franks and W. O. Binder, of the Union Carbide & Carbon Research Laboratories, Inc.

This investigation showed that the modulus of elasticity of wrought annealed 18 per cent Cr, 8 per cent Ni steels is approximately 28,000,000 lb. per sq. in. and the proportional limit is on the order of 20,000 lb. per sq. in. with a tensile strength between 80,000 and 90,000 lb. per sq. in.

In confirmation of work of other investigators, the authors found that even though the tensile strength of the annealed 18-8 steel can be greatly increased by application of cold-work, the indicated proportional limit of the metal remains low, and the modulus of elasticity is somewhat lower than that of the annealed steel, especially in the direction of rolling. In the transverse direction to rolling the cold-rolled steels have a somewhat higher proportional limit with a modulus of elasticity equal to that in the annealed condition.

It was further shown that if the cold-

CHARLES H. HERTY, JR.
Howe Memorial Lecturer

worked metal is heated to about 200 deg. C. (392 deg. F.) and air-cooled it will act more normally when stressed, and exhibit a considerably higher observed proportional limit and yield strength (0.20 per cent set) with a modulus of elasticity of approximately 28,000,000 lb. per sq. in. at room temperature. This treatment produces increased fatigue resistance and improves toughness somewhat without rendering the steels subject to intergranular corrosion or reducing their resistance to general corrosion. The treatment does not impair tensile strength, ductility or the bright cold rolled surface. Only a slight yellowish coating develops during the heating period, and that is readily removed, if necessary, by a dip into hot nitric acid solution.

The elastic properties of cold-rolled 18 per cent Cr, 8 per cent Ni steels containing either columbium or molybdenum are likewise improved by heat treating under the same conditions.

It was emphasized by the authors that the time factor is most important in bringing about the improvement, and that unless the heating period is long enough the improvement in elastic properties will be neither substantial nor uniform. From the standpoint of practice, it was suggested that the heating period consume at least 8 hr. but no more than 100 hr., in the range from 200 deg. to 250 deg. C. If these conditions are adhered to in treating plain or modified cold rolled 18-8 steels, the opinion was expressed that they are without a peer for use in light-weight, high-strength structures.

LOUIS D. RICKETTS
James Douglas Medalist

Institute of Metals

Interest in non-ferrous metals centered in the sessions of the Institute of Metals Division. Three of these sessions were devoted to recrystallization, papers being read on aluminum, platinum, nickel, and brass. Other sessions were given over to copper and silver alloy systems and to general physical metallurgy.

The "Acceleration of Rate of Corrosion by High Constant Stresses" was the subject of the annual lecture

ALDEN B. GRENINGER
Recipient of Institute of Metals Award

of the Institute of Metals Division, delivered by E. H. Dix, Jr., Aluminum Co. of America. Metal structures in service are commonly subjected to stress as well as to corrosion. Stress often accelerates the rate of corrosion, causing cracks at points below the breaking strength of the alloy even under mild corrosion. This phenomenon has been given different names, such as, "season cracking" (of brass), "caustic embrittlement" (of boiler plate), "disintegration" (of the old impure zinc-base die-casting alloys), "embrittlement" (of lead cable sheath), and "stress corrosion" (of the early high-zinc aluminum alloys and some stainless steels).

The lecturer suggested a theory to explain these phenomena by the difference in the solution potential of the three phases existing where such corrosion occurs, namely, the rich solid solution, the precipitated particles and the impoverished area surrounding the precipitated phase. In the presence of an electrolyte this difference in potential sets up an electrolytic couple of high current density with consequently accelerated corrosion.

HERBERT G. MOULTON
President of A.I.M.E. for 1940

Failure of this type has been found to follow grain boundaries. Evidence was presented by the lecturer to show that intergranular corrosion is caused by the grain boundaries (either the precipitated phase or the depleted area surrounding it) being anodic to the grain centers in the corrosive environment to which the material is being subjected. If there is a condition of high stress acting in a direction tending to pull the metal apart along the path of the grain boundaries, and if the metal is subjected to a corrosive environment producing the specified potential relations, corrosion starts along the anodic paths. This produces a concentration of stress on the bottom of the notches so formed. As the stress increases, fissures begin to develop, destroying any protective film and thus exposing fresh anodic material to the corrosive medium. Corrosion will proceed more rapidly and at the same time the stress will increase at an accelerated rate, especially if the material is at the same time subjected

to a high external load. These mutually accelerated actions will continue at an increasing rate until the metal fails.

The lecturer described and illustrated accelerated stress corrosion tests developed in the Aluminum Research Laboratories. He also looked forward to a broader general understanding of this condition so that metallurgists, engineers, and users of metal might exercise better selection of alloys and more suitable mechanical design.

NON-FERROUS METALS

Recrystallization, Anodic Films, Cold Work and Annealing Are Considered

"Some Factors Influencing the Recrystallization of Cold-worked Metals as Observed on Nickel," were noted by Erich Fetz, Wilbur B. Driver Co. Microscopic and hardness tests on carbonyl nickel, electrodeposited nickel and cold-worked, recrystallized electrolytic nickel submitted to the same plastic deformation and annealing treatments, led to the following conclusions:

(1) The smaller the grain size and the greater the residual stresses (from electrodeposition) prior to cold working, the lower the recrystallization temperatures.

(2) The state of the metal before working affects not only the minimum temperature but also the extension of the recrystallization and hardness recovery temperature range, which is extended in the case of large-grained, unstrained metal.

(3) Recrystallization and recovery from work hardening (plus electrodeposition hardness) take place in practically the same temperature range.

"An X-ray Study of the Alloys of Silver with Lead, Bismuth and Thallium," was presented by Haim H. Chiswik and Ralph Hultgren, Harvard University. In recent years considerable attention has been devoted to the development of new commercial uses for silver, chiefly because of lowered prices and large stocks of the metal. This has led to increased interest in the phase diagrams of silver alloys. The silver-lead diagram is reported to be of the simple eutectic type, but no measurements of the solubility of lead in silver have been made. The silver-bismuth diagram is similar.

The authors studied these diagrams by X-ray methods, verifying their main features and determining the solubilities of lead and bismuth in silver at several temperatures. They also determined the solubility of thallium in silver at one temperature. The solubilities of silver in lead and in bismuth were found to be too low to be detectable.

"The Copper-Rich Alloys of the Copper-Nickel-Phosphorus System" was presented by D. K. Crampton, H. L. Burghoff and J. T. Stacy, all of the Chase Brass & Copper Co. This paper gave some of the results obtained in an investigation of copper alloys of the age-hardening type containing small amounts of nickel-phosphorus. It covered the solubility relationships in the copper-rich portion of the copper-nickel-phosphorus system which have great capacity for being hardened and also relatively high electrical and thermal conductivity in the hardened state. Also the increased hardness and strength imparted by aging can be greatly augmented by cold working, resulting in excellent combinations of conductivity and strength.

In the copper-nickel-phosphorus alloys containing up to 8 per cent nickel and 1 per cent phosphorus, solidus surface and the limits of alpha solid solubility were determined. Solubility of nickel and phosphorus decreased noticeably with decreasing temperatures, and in some instances as little as 0.2 per cent Ni+P formed a second phase at 500 deg. C.

The best properties were found in alloys with a nickel-phosphorus ratio of about 5 to 1.

Investigation of this type showed that the most useful hardenability occurs in alloys with about 1.25 to 1.5 Ni+P. In alloys containing about 1 per cent Ni+P in the desired ratio, electrical conductivity of about 67 per cent I.A.C.S. and tensile strength of about 65,000 lb. per sq. in. were realized. These alloys can be extensively cold worked after age-hardening with further increase in strength.

Alloying elements, such as tin, cadmium and zinc, resulted in increased strength but lower conductivity.

"An Electron Diffraction Study of Anodic Films" was presented by R. A. Harrington, B. F. Goodrich Co., and H. R. Nelson, Battelle Memorial Institute. The structure of anodic films formed on aluminum and other metals under varied conditions is not well known despite the wide use of such films both as protective coatings and as the dielectric medium in electrolytic condensers. The present work was undertaken as a survey of the possibilities of electron diffraction in the investigation of anodic films, especially in comparing the properties of anodic films formed under different sets of conditions and subjected to various subsequent treatments. In addition, an effort has been made to compare surface films formed on aluminum by anodic treatment with surface films formed by heating, immersion in chemicals, etc.

From the fact that aluminum anodized at room temperature usually gave diffuse patterns, it is inferred that anodic films formed on aluminum in a wide variety of electrolytes at ordinary temperatures are amorphous. Anodic treatment in solutions at higher temperatures tends to produce anodic films having less random structure, which may possibly be described as crystalline with very small grain size. Heating the anodic film on aluminum at temperatures up to 650 deg. C. does not appreciably change its structure, although crystalline oxidation products are formed on unanodized aluminum at temperatures about 300 deg. C. In this respect the anodic film is different from the ordinary air-formed oxide films on aluminum, since the latter is probably transformed at these temperatures to crystalline substances.

Under certain conditions anodic films formed on tantalum and titanium are at least partly crystalline, and under other conditions they are probably amorphous.

Immersion of metallic aluminum in boiling chemical solutions gives definitely crystalline films, in contrast to the usual results with anodic treatment.

"A Metallographic Study of Internal Oxidation in the Alpha Solutions of Copper" was given by Frederick N. Rhines, Carnegie Institute of Technology. Pure copper that has been allowed to oxidize at an elevated temperature in the air is found to be covered with

two distinguishable layers of oxide scale. The outer of these, which is very thin, is composed of cupric oxide, while the inner layer, comprising the bulk of the scale, is made up chiefly of cuprous oxide. If a small quantity of an alloying element, such as silicon, is present in the copper, silica particles are found disseminated through the cuprous oxide, deposited most abundantly near the metal surface, and, in addition, silica particles occur to a limited depth within the copper itself. It is this inner layer, composed of oxide particles precipitated in a matrix of metallic copper, that is known as the "subscale" or the zone of internal oxidation. Under a low oxygen pressure it is possible to produce the subscale without the formation of external layers of copper oxides, thus leaving the metal surface bright and apparently clean while oxidation has occurred, in fact, to a considerable depth within the metal.

A group of 40 binary copper alpha-solid solution alloys was subjected to oxidation at elevated temperatures both in the air and in a closed container packed with a mixture of copper metal powder and cuprous oxide. Internal oxidation was found in the binary combinations containing Al, Sb, As, Ba, Be, B, Cd, Ca, Ce, Cr, Co, Cb, Ga, Ge, In, Fe, Pb, Li, Mg, Mn, Ni, P, Se, Si, Na, Sr, Ta, Sn, Ti, W, V, Zn, and Zr. External oxidation alone was found in alloys with Ag, Pt and Pd. The behavior of alloys containing Bi, S, Te and Tl was uncertain.

The rate of growth of the subscale decreases with time, with an increasing concentration of the alloy, with lower temperatures and with lower oxygen pressures.

Ternary alloys containing copper with tin or zinc and aluminum, beryllium, or silicon, all exhibited double zones of internal oxidation, the outer band containing the oxides of both metals and the inner band the oxide of only one metal. The relative widths of the bands can be varied by changing the alloy composition and the precipitation of one of the oxides may be suppressed by sufficiently lowering the oxygen pressure.

"The Recovery and Recrystallization in Long-time Annealing of 70-30 Brass," was the subject of a paper by S. E. Maddigan and A. I. Blank, Chase Brass and Copper Co. An investigation was made of the processes of recovery and recrystallization during low-temperature annealing of cold-worked 70-30 brass. Two annealing temperatures were used, one slightly above, and the other slightly below the accepted recrystallization temperature. After various annealing times up to 2740 hr., microscopic studies were made in addition to tensile-strength measurements and very sensitive conductivity measurements.

E. H. DIX, Jr.
Lecturer, Institute of Metals Division

The process of softening seems to be divided into two parts: (1) a stage of pure recovery preceding any microscopic evidence of recrystallization; (2) a second stage in which recrystallization can be seen under the microscope and softening is probably a combination of recovery and recrystallization. The boundary between these stages was fixed at almost identical times by all the methods of investigation: i.e., microscopic, tensile strength, and conductivity.

The time for beginning of recrystallization increases with increasing grain size, decreasing amounts of cold-work, and decreasing temperature.

"The Effect of Cold-work Upon Hardness and Recrystallizing Behavior of Pure Platinum" was shown by E. M. Wise, and R. F. Vines, International Nickel Co., Inc. It is known qualitatively that the recrystallization behavior of platinum is dependent upon the amount and particularly the nature of impurities present, the amount of prior cold-work and the annealing time and temperature, but published data are limited. A study of the effects of cold-work and annealing temperature on the hardness of a sample of very pure platinum was undertaken to supply part of this information.

The effect of cold-rolling on the hardness was shown. The hardness increases rapidly up to 10 to 15 per cent reduction and more slowly up to about 75 per cent reduction, beyond which it increases more rapidly.

The recrystallized grain size was a function of the percentage of cold reduction, being larger, the lower the percentage of cold-work.

Little or no grain growth resulted from subjecting recrystallized samples to higher temperatures or annealing for longer times.

"The Cobalt-Nickel-Silicon System between 0 and 20 Per Cent Silicon" was discussed by Arthur C. Forsyth and R. L. Dowdell, University of Minnesota, Minneapolis, Minn. The paper described the results of a study of 76 alloys from which the partial ternary diagram of the cobalt-nickel-silicon system was drawn.

A partial cobalt-nickel-silicon constitution diagram below 19.3 per cent Si was presented. Nickel and cobalt seem to replace each other in these alloys, producing only two phases in stable equilibrium.

The alpha solid solution alloys are all capable of being wrought and may find industrial application. Their properties are now being investigated. Alloys above 10 per cent Si are brittle but have excellent corrosion resistance and have properties that are being exploited. Alloys containing alpha are ferromagnetic.

Another paper presented was:

"The Correlation of Deformation and Recrystallization Textures of Rolled 70-30 Brass," by R. M. Brick, Yale University.

THIS WEEK ON THE ASSEMBLY LINE

o o o

By W. F. SHERMAN
Detroit Editor

o o o

73 per cent of purchasing agents continue to buy two and three months ahead despite minor retrenchments . . . Auto production steadies itself, and February estimates push upward optimistically . . . Studebaker celebrates 88th birthday . . . Ford's six-cylinder car believed on the way for next year . . . Chain store tax victory won by Ford for industry.

DETROIT—A tendency to look ahead toward spring—in buying and in planning automobile production—is apparent in Detroit today.

A large proportion of purchasing agents—73 per cent—are covering and maintaining a coverage for two and three months ahead despite somewhat timorous views in some other quarters. Statistical evidence that the Detroit area is maintaining a policy of buying well into the future is offered in a current report from the Purchasing Agents Association. This indicates that a few have slipped into the 30-day and hand-to-mouth brackets, but the long-term buyers are holding their ground.

Increase in hand-to-mouth buying made during January was only from 4 to 7 per cent; and the gain in 30-day buying was only from 6 to 8 per cent. The 60-day and 90-day groups were 38 to 35 per cent respectively (total 73 per cent), compared with 29 and 47 per cent respectively in the last month of 1939 (total 76 per cent). Some retrenchment was apparent in the small group that has been buying six months ahead (a drop from 14 per cent to 9 per cent) but 3 per cent resumed buying on a nine-month scale.

It is reported that General Motors' recent buying of steel has been on a relatively small scale and further buying by Fisher and other GM divisions is expected. Only in the case of Chrysler and its principal suppliers is there any indication that inventories need whittling down before buying is resumed. It is quite definite that Briggs' inventory for Chrysler needs is ample. At the present rate of production the supply probably will not be exhausted before April 1. The same condition appears to prevail at Chrysler. This is attributable to the strike last fall, which set back production about two months.

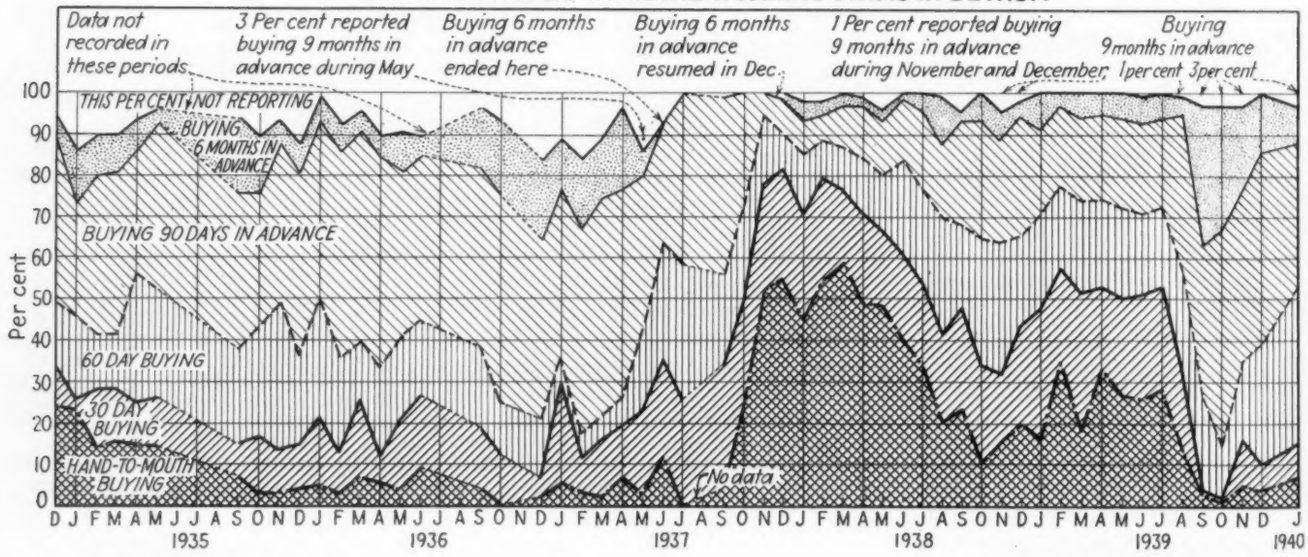
Among recent steel buyers (since Feb. 1) Packard can be listed. At least until the early spring upturn arrives, buying activities by most companies are expected to be rather routine.

Outlook Is Bright

The mid-winter outlook for the entire automobile industry is quite bright and estimates of final February production figures are undergoing optimistic upward revisions. At least there will be no wholesale reduction in manufacturing schedules during the latter part of February. The new estimate for the month is 360,000 units, up 20,000.

The weekly production survey of

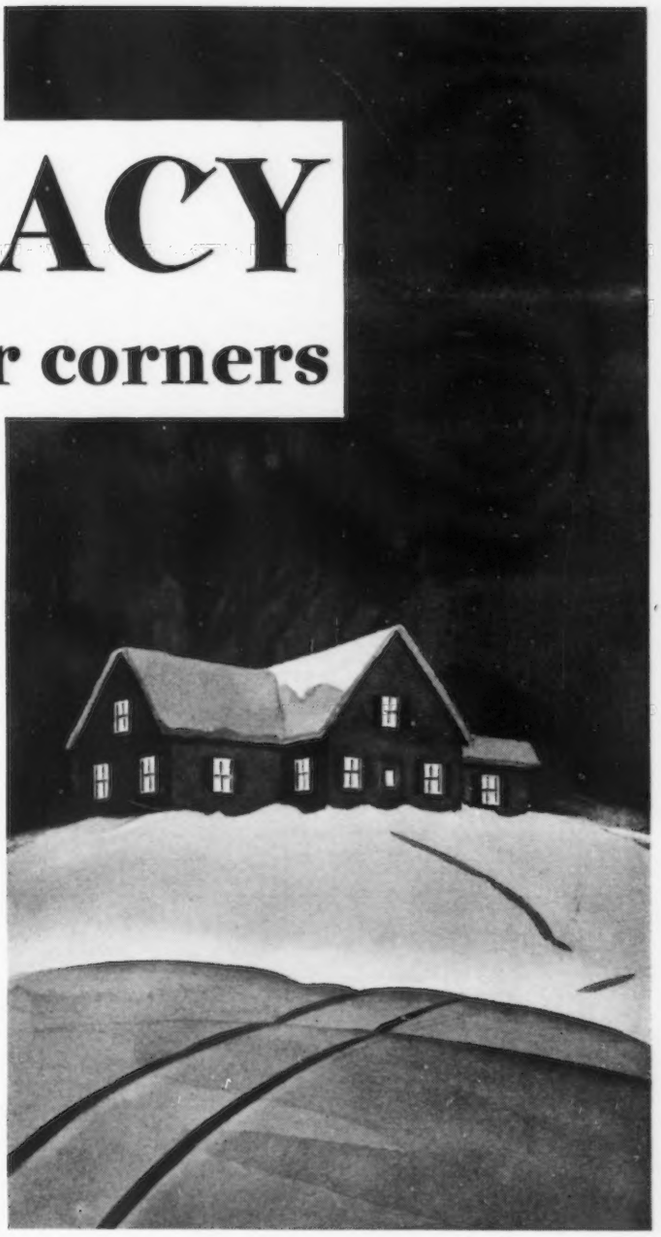
BUYING TRENDS IN METAL-WORKING FIRMS IN DETROIT


Data not recorded in these periods
3 Per cent reported buying 9 months in advance during May
Buying 6 months in advance ended here
Buying 6 months in advance resumed in Dec.
1 Per cent reported buying 9 months in advance during November and December
Buying 9 months in advance 1 per cent 3 per cent
THIS PER CENT NOT REPORTING
BUYING 6 MONTHS IN ADVANCE
BUYING 90 DAYS IN ADVANCE
60 DAY BUYING
30 DAY BUYING
HAND-TO-MOUTH BUYING
No data
Per cent
100
90
80
70
60
50
40
30
20
10
0
D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J
1935
1936
1937
1938
1939
1940

Prepared by THE IRON AGE from data supplied by PURCHASING AGENTS ASSOCIATION OF DETROIT

These data cover a wide industrial field, including stove, refrigerator, office equipment, steel, auto parts, accessary and auto plants.

ACCURACY
brightens the far corners

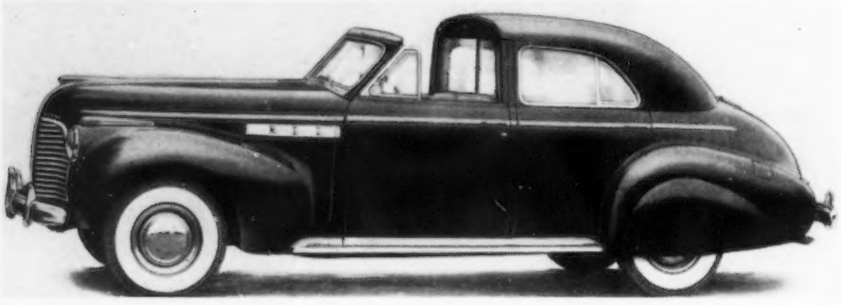


A FEEBLE yellow flicker from a fragile, costly bulb in a few wealthy homes has—in the course of forty years — been stepped up to a strong white light that brightens the remotest corners of the land. Today's light bulb costs only a few cents; it is remarkably efficient . . . and its efficiency is even now being constantly increased. Accuracy makes the difference. Precision manufacture — machine tool performance accurate to "tenths" — consistently creates new wealth, comfort, convenience, and safety for all people.

At Pratt & Whitney, accuracy is a deep-rooted tradition . . . an exacting shop rule laid down by the founders eighty years ago and today vigorously embraced by over 2000 skilled Pratt & Whitney craftsmen who include in many instances, several generations of the same family. The accuracy they build into Pratt & Whitney machine tools, cutting tools and gages lets alert managers reduce costs, expand production and win new markets. When you buy, investigate Pratt & Whitney precision equipment. It pays big dividends.

PRATT & WHITNEY

Division **Niles-Bement-Pond Company · Hartford, Connecticut, U. S. A.**



BUICK goes formal—newest addition to 1940 line is this custom built town car with body by Brunn. It is the custom body builder's version of the popular streamlined styling introduced by Buick this year and is available on the Buick Series 70 Roadmaster chassis with 126 in. wheelbase and 141 hp., and the Series 50 Super chassis with 121 in. wheelbase and 107 hp. Above is the Roadmaster model.

Ward's Automotive Reports reveals unusual steadiness throughout the industry, attributable largely to sustained sales volume so far this year.

The steadiest of all the automobile companies was Ford, which again produced 20,600 vehicles on a four-day working schedule. General Motors and Chrysler showed slight declines, the former to 37,355 from 38,388 in the previous week, and the latter to 25,790 from 25,905. Chevrolet dropped 500 units to 21,500, and Plymouth registered a minor gain from 11,840 to 11,915. Severe storms in the east restricted output of some plants.

Last week's output for the entire industry totaled 95,050, compared with 95,980 in the previous week and 79,860 in the corresponding week last year, according to Ward's.

The figures which have generated optimism in the industry are the registration data and sales reports which were not available until January was past. For instance, January showed a surprising gain over December sales and registrations and, in one instance, February is reported as showing a substantial gain over January. The advance registration figures accumulated by R. L. Polk & Co. from 113 metropolitan centers (for only the first 26 days of January) showed January passenger car registrations for all makes and all states slightly ahead of December.

Chevrolet, reporting a January total of 73,328, showed a gain of 40 per cent over January, 1939, and came close to the best January record of that company, in 1936. The performance was continued through the first 10 days of February, with a gain of 13.7 per cent over the comparable period of last month. This example was paralleled by Buick, which is maintaining through these winter months a level 47 per cent better than last year. Pontiac set an all-time high for January with a total of 13,671. Unfilled orders on this company's books at the end of January were 4.4 times greater than at the same time last year. Ford also reports strong mid-winter sales, despite unusually severe weather conditions, particularly in the South. The factory reports sale of 65,435 Fords and Mercurys, a gain of 14,580 over January, 1939.

Studebaker Corp., America's oldest vehicle manufacturer, has celebrated its 88 birthday. The occasion was marked on Feb. 16, with H. V. Kimble, who has been with Studebaker since 1882, recounting experiences in his personal acquaintanceship with the five Studebaker brothers who founded the business in 1852 with an initial capital of $68. Paul G. Hoffman, president, was host to employees with long service records. He related that the average employee has been with the company 11 years, whereas the average in other automobile plants is six years.

New Models Being Planned

Plans for 1941 models are beginning to play an important part in discussions in Detroit. It is indicated that one of the pacemakers will be Buick, with indications that the Series 40 will be an entirely new car. The engine production line will be retooled for this small engine and there will be considerable retooling for other units that make up the automobile. Retooling is aimed at three important points — greater production economy,

THE BULL OF THE WOODS — BY J. R. WILLIAMS

I INFORMED THAT SHOP COMMITTEE I'D SEE THEM AT THREE O'CLOCK-- WHY AREN'T THEY HERE? IT'S TEN AFTER NOW-- WHAT DO THEY THINK THIS IS? WHAT DO THEY THINK I AM? WHAT ~
SHALL I SEE WHAT'S KEEPING THEM, SIR?
THEY THOUGHT THEY'D KEEP THE OL' MAN WAITING AN' GET HIM NERVOUS LIKE HE DOES THEM-- BUT IT ONLY MAKES HIM MAD-- NOW THEY'RE NERVOUS
SAY WHAT YOU WILL, ONE MAN CAN LICK A DOZEN IF TH' DOZEN ALL TRY TO DO TH' THINKIN'!
PRESIDENT
PRIVATE
HEROES ARE MADE -NOT BORN
COPR. 1940 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
J.R. WILLIAMS
2-16

greater output and improved design. Body styling is expected to follow the torpedo lines introduced this year. Other Buick models are not expected to undergo major changes.

Dodge is making plans to tool up for a new transmission to be produced at the rate of 50 an hour. Some question exists whether new machines will go into the present shop line-up or a small new building erected for transmission manufacture.

Indications of important Ford plans come in word that the company may be interested soon in manufacturing a lighter transmission than that currently produced. Estimates are being made on the basis of 75 units per hour. Hardly a matter that can be kept secret, is the information that Ford Motor Co. also has brought a six-cylinder engine through its most important development stages and is laying plans to tool up to produce this six. If all plans bear fruit, the Studebaker Champion will be joined by a light six Ford along with the long-promised light Nash and little Packard.

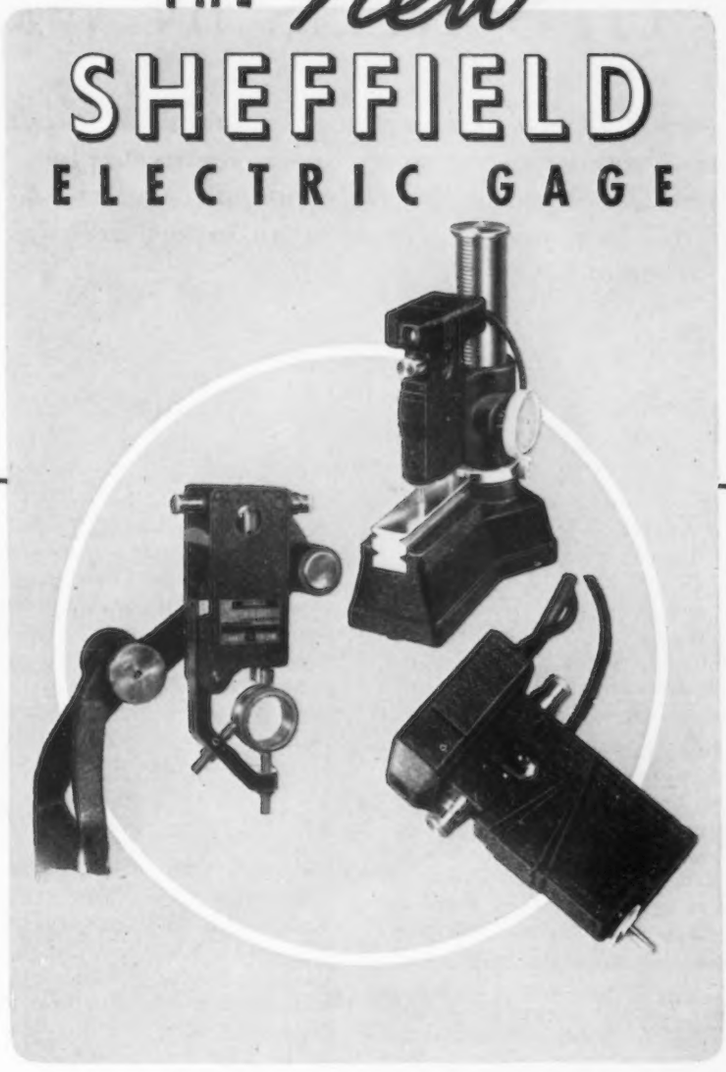
Ford Wins Court Victory

A sweeping court victory of vital importance to all manufacturers who have distributer and dealer outlets for their products has been won by Ford Motor Co. Victorious on all points, the Ford case apparently settles the question whether chain store taxation shall be imposed in the case of such distributer-dealer outlets. In its decision the Federal District Court ruled that Colorado's chain store tax was of a type purely for economic and social regulation. The court found that the main purpose of the law was to protect the small merchant by the imposition of exactions on the chain which would, to some extent, equalize conditions between them and that it was not primarily for the purpose of raising revenue. The law was held inapplicable to automobile concerns.

Belleville Stove Plants Resume Production

ST. LOUIS—The five stove foundries in the Belleville (Ill.) district have resumed operations after having been down for from three to five weeks. Operations are now on a three-day week basis, which probably will be increased in March. Plants are working on the spring lines and on stock goods for shipment in July and August, with production of the latter proceeding cautiously pending orders from mail-order houses and other large buyers.

THE *New*
SHEFFIELD
ELECTRIC GAGE



The new Sheffield Electric Gage, incorporating the frictionless, mechanically positive Reed Mechanism, is the most rapid precision comparator. When used in inspection work the indicator light flashes red when the part is undersize, green when oversize and amber when it is within specified tolerances.

The Electric Gage consists of three main parts, gaging head, light unit and base assembly. The gaging head, with or without the light unit, is used in connection with special fixtures to control the machining of work pieces while cutting is in progress—also for automatic or multiple gaging and for automatic classification of finished work pieces. • *Write for complete details.*

SHEFFIELD
GAGE CORPORATION • DAYTON, OHIO, U.S.A.
MASTER GAGEMAKERS
NITRIGAGES

THIS WEEK IN WASHINGTON

. . . Senator Davis opposes steel basing point change . . . House Committee testimony spurs sentiment for NLRB shakeup . . . Strategic Materials Committee advises Government to "buy now" . . . Steel scrap export licensing considered remote.

o o o

By L. W. MOFFETT
The Iron Age

o o o

WASHINGTON—Sentiment in Congress for a shakeup of the National Labor Relations Board and its personnel, and revision of the Wagner act, has been increased by additional revelations of sharp practices disclosed by the Special House Committee investigating the board.

High powered lobbying and boycotting of business were brought out into the open by J. Warren Madden, board chairman. After Mr. Madden admitted knowledge of pressure brought by the board and its employees on Congress against slashes in board appropriations and changes in the Wagner act, Howard W. Smith, committee chairman, wrote a letter to Attorney General Robert H. Jackson requesting an opinion whether the board members and employees had violated a statute, which prohibits lobbying by Federal employees.

Edmund M. Toland, committee counsel, who read the statute during the course of Mr. Madden's testimony, said he was making no charges but board correspondence he submitted, together with the admission by Mr. Madden that he knew of organized activities of regional officers and employees to prevent appropriation cuts, were held to make out a clear case against the board. Under the law, the President could remove the board if it were found guilty after a hearing, though the prospect of such a development is held to be dim. Nevertheless the ruling, if any, by Mr. Jackson is awaited with interest. Noted for his bitter attacks on business where law violation is charged—and even where infractions are not alleged—there is speculation whether Mr. Jackson will be equally as bold in dealing with the board, an administration pet.

Lobbying by government agencies never was so widespread or so brazen as under the New Deal administration and application of the federal law would result in a wholesale shakeup of the vast government bureaucracy, from the top down, which obviously is improbable.

Mr. Madden calmly recited an amazing story of arrangements made by the board with the Reconstruction Finance Corp. by which the latter withheld loans from companies even when complaints of Wagner act violations were only under consideration. This practice has been branded as blackjacking, and knowledge that the RFC had participated in it came as a shock, unless as one of its members said, the committee has become shockproof.

The RFC had gained a reputation of straightforward and intelligent administration under the direction of Jesse H. Jones, now carrying the title of Federal Loan Administrator. Mr. Jones conceded that the three loans of small amounts had been withheld "temporarily" until cases before the board had been settled. In two cases, he said the complaints were subsequently withdrawn by the board and in the other the applicant got his loan elsewhere and withdrew his application. He further said that he "understood" a few small loans had been withheld temporarily at the request of the Wage and Hour Division of the Labor Department, which Mr. Madden had testified he "understood" had in effect an arrangement with the RFC similar to that made by the NLRB.

Others Did Likewise

Mr. Jones issued a statement in which denial was made that any blacklist of borrowing corporations had been compiled but because of the extent and length of the practice he occasioned surprise when he added that the same procedure had been followed with reference to the board and other Federal regulatory bodies for five years. Mr. Jones added that no loans of consequence had ever been held up as a result of the arrangement.

The boycott-lobby activities of the board fit in perfectly with the CIO's unavailing efforts to have the Walsh-Healey Public Contracts act amended so as to prohibit government contracts for employers who are in the disfavor of the CIO. Steel companies are in the list which the CIO and labor board would like to have blacklisted. Congress has consistently declined to accede to pressure for such an amendment.

Governed by Statutes

The arrangement to bar loans to companies alleged to have violated the Wagner act was revealed in a letter of Aug. 7, 1939, written by Nathan L. Witt, NLRB executive secretary, to George R. Cooksey, RFC secretary.

Chairman Smith of the House Committee asked Mr. Madden on what theory the government could withhold a contract from a low bidder who was either charged with or convicted of unfair labor practices.

"I suppose as a matter of sense and common sense," blithely replied Mr. Madden.

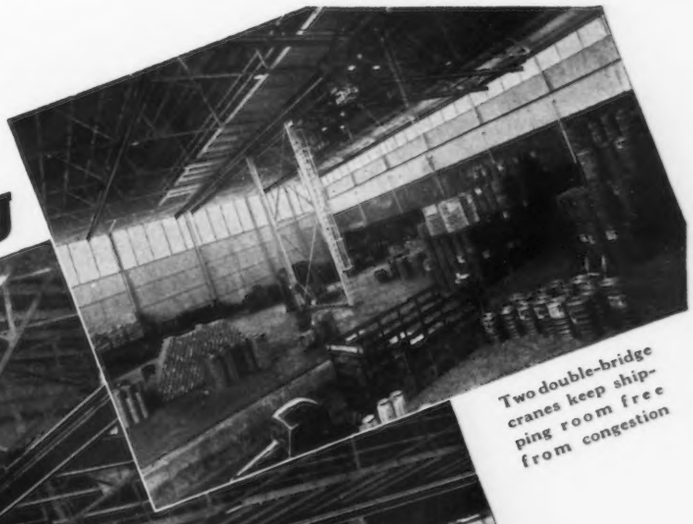
"Oh, no, we are governed by statutes," responded the representative.

Disclosure of the board's lobbying activities was made when Mr. Madden identified letters he sent in 1937 to Harry Van Arsdale, Jr., New York, business agent of Local 3, International Brotherhood of Electrical Workers, and A. O. Wharton, president of the International Association of Machinists, thanking them for telegrams they dispatched to Congress concerning board appropriations. Under questioning by Representative Harry Routzohn, Republican of Ohio, Edwin S. Smith, board member, admitted that he had telephoned—at government expense—in 1937 to Charles Hope, regional director, Seattle, asking Mr. Hope to communicate with labor leaders and others respecting a threatened cut in board appropriations.

Saposs Is Questioned

Previously under fire before the Dies Committee, when he was quizzed on charges that he was sympathetic with Communism and a member of left-wing organizations, David J.

INDUSTRIAL AIR WAYS for low cost handling



Two double-bridge cranes keep shipping room free from congestion

Fast bridge travel and accurate control assures low costs.

High piling brings profitable return from storage space.

"Stock piled twice as high" — "Capacity increased by 22 tons per day" — "75% reduction in handling cost" — such reports as these verify our engineers' recommendations after many an American MonoRail installation.

This is possible not only because mechanical methods provide low cost movement of goods or release of skilled labor for profitable production, but also by the flexibility of American MonoRail equipment which offers unlimited opportunity for "tailor-made" systems at remarkably low cost.

With their wide experience in this highly specialized field American MonoRail engineers often reveal hidden possibilities for cost savings or production increases. Their services are available without obligation.

SEND FOR THIS BOOK

254 page catalog sent on letterhead request.

THE AMERICAN MONORAIL COMPANY

13103 Athens Ave. Cleveland, Ohio

Saposs, Russian born chief economist of the NLRB, was closely questioned by Mr. Toland whether he had written articles advocating socialism as preferable to capitalism.

"I do not believe so," replied Mr. Saposs. "I have my own opinions and I have written articles discussing various phases of the labor problem."

He said that, although he had been a member of the socialist club at the University of Wisconsin, he did not believe that he had written articles advocating socialism in the United States.

An extract of an article by Mr. Saposs appearing in *Labor Age* in 1931, was read by Chairman Smith.

"As for democracy, the opposition also wants to safeguard it," it read. "But bourgeoise democracy is a sham. When it is evident that socialism is the only remedy, it is not worth having a democracy in which socialist parties only collaborate with capitalism."

Mr. Saposs said that this and other quotations from the article merely reflected the point of view of the opposition at the Fourth Congress of the Labor and Socialist International in Vienna in 1931. Mr. Toland asked Mr. Saposs to place in the record at the next hearing the entire list of his writings.

Meanwhile, there is considerable doubt that the Wagner mediation bill to extend the conciliation service of the Labor Department really would go far in that direction. While the idea of a mediation law such as the Railway Labor act, meets with much favor in Congress, as does the Conciliation Service, there is an impression that Senator Wagner is more interested in removing pressure from the NLRB than he is in revising the labor act, of which he was the chief sponsor.

Scrap Licensing Bill's Chance of Passage Now Considered Remote

WASHINGTON—On the basis of testimony presented to the House Military Affairs Committee at a one-day public hearing last week, the chance for passage of the Maloney-Smith bill to license the exportation of iron and steel scrap appears to be extremely remote. Representative J. Joseph Smith, Waterbury, Conn., lawyer, was dubious this week about the legislation, which he sponsored, being reported out of committee, but he told THE IRON AGE that he would continue to push for its enactment.

Mr. Smith, in Congress since 1935, conceded that because of testimony given by War and Navy Department spokesmen last week, in which they questioned the necessity for the bill from a national defense standpoint, it may be necessary to revise the measure and refer it to another committee in the House. If such a procedure is followed, presumably the bill would be reintroduced strictly as a conservation measure.

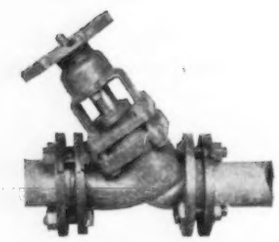
Must Prove Shortage

In any event, it appeared highly unlikely that any bill designed to restrict the exportation of scrap would receive favorable action at the hands of Congress without proof that a shortage of scrap exists. Even in that event, the measure sooner or later conceivably would be broadened to include similar restrictions on other related exports. Moreover, many observers considered it probable that further export restrictions, should any be made, would take the form of a "moral embargo" but this step would be taken by the Administration and not by Congress. Hence, such an embargo could be applied to iron and steel scrap if the Administration so desired as part of its program for taking "economic measures short of war" against aggressor nations.

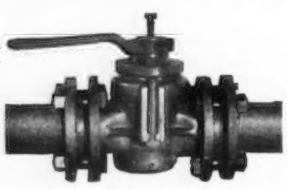
While reports on the Maloney-Smith measure have been prepared by various government departments affected, they have not been cleared by the Budget Bureau, but testimony given the House committee last week by spokesmen for the State, War and Navy Departments indicated that the views of each have changed at least to a limited degree during the past two years. The net result is that scrap licensing proposals appear to stand less chance of passing than they did two years ago.

When the Senate Military Affairs Committee failed to act favorably on similar legislation in 1938, opposition from the State Department, due to Secretary Hull's dislike of trade re-

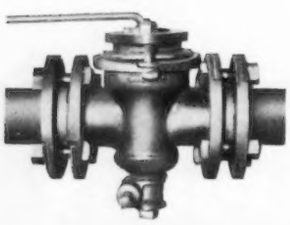
YOU pay the cost of corrosion



Duriron Y Valve



Duriron-Nordstrom lubricated Valve



Duriron Type 600 lubricated Valve

Theoretically, the customer pays it, because the cost of normal replacement of production equipment is figured in the selling price of the goods you produce.

But when maintenance costs go up due to frequent replacements, lost time, etc., the cost is usually absorbed: you pay it.

DURIRON VALVES

Duriron Valves reduce the cost of corrosion, because they are corrosion-resisting. They are made *especially* for use with corrosive liquids. Each type is designed for mechanical excellence as well as for corrosive service. Naturally, they cost less per year of service, as long service is built into them.

There are many types built in Duriron—Y valves, lubricated and mechanical lift plug valves, gate valves, plug cocks, check valves, foot valves and others — in the most-used sizes.

Write for Bulletin No. 601. It contains complete data on styles and sizes, and dimensions for layout purposes.

THE DURIRON CO., Inc.
438 N. Findlay St. Dayton, Ohio

In 1937 "*more Cyclones being sold than all other air tempering furnaces combined*"

Today:

"Twice as many Cyclones are being sold as all other air tempering furnaces combined"

IN 1937 more CYCLONES were sold than all other air tempering furnaces combined. That was but two years after the CYCLONE TEMPERING FURNACE was announced to the heat treating world. *Today*, five years after its announcement, the CYCLONE surpasses even that remarkable 1937 record—for today *twice as many* CYCLONES *are being sold as all other air tempering furnaces combined.*

Why is it that heat treaters give the CYCLONE such overwhelming preference? Why is it that one organization alone has bought an average of almost one CYCLONE a month in the 60 months since the CYCLONE was announced? Why is it, since jumping instantaneously into outstanding favor with heat treaters, the CYCLONE has not only held the lead, but in spite of the biting test of time and in spite of the number of imitations of its principle the CYCLONE has actually *doubled* its lead?

The answers come from the hundreds of heat treaters and executives who operate the nearly 1000 CYCLONES in service. They prefer the CYCLONE because their CYCLONES are making money for them with every heat by turning out their work within the closest specifications being written today—by turning out heat after heat more rapidly and without faltering. For in spite of its laboratory accuracy the CYCLONE is built like a battleship, with *nothing* skimped. The massive top casting can be whammed and smacked with the heaviest basket load of parts imaginable—but it won't wince a bit—for it's thick and solid and substantial. And the work chamber with its armor-plate lining has the same kind of courage—and takes the most malicious abuse without a trace of folding up. And the circulating fan with its husky shaft and air-cooled ball bearings—all these and many more are the things that go into giving CYCLONE users the most perfect tempering that any money can buy. Tempering that's right today—tomorrow—and right for years to come. Tempering that stole the show in 1937—and tempering that heat treaters like so well they're buying twice as many CYCLONES today as all other air tempering furnaces combined.

LINDBERG ENGINEERING CO.
228 North Laflin Street • Chicago, Illinois

strictions, was generally credited with having defeated the measures.

Now apparently the State Department does not consider foreign policy to be involved if Congress considers scrap licensing essential for the national defense, according to testimony given the House Military Affairs Committee last week by Dr. Herbert Feis, adviser to Mr. Hull on economic affairs. Reconciling this view with the State Department's previously-expressed attitude was difficult. Moreover, when legislation was proposed in 1936 for the licensing of tin plate scrap exports,—legislation to which the State Department objected and which was used as a pattern in drafting the Smith bill—foreign policy was considered to be so definitely involved that the measure was handled by the House Foreign Affairs Committee.

Members of the State Department's Munitions Control Board, the agency designated by President Roosevelt in 1936 to administer the tin plate scrap exporting law, are known to feel that the Smith measure would be impossible of administration. Representatives of the Independent Steel and Iron Producers' Committee on Scrap suggested to the House committee last week that the Bureau of Mines, in view of its recent surveys on scrap supplies, might be preferable as the administrative agency empowered to license scrap exports.

In June, 1937, the War Department recommended to the Senate Military Affairs Committee that Congress pass a scrap licensing measure introduced by Senator Lewis B. Schwellenbach, Democrat of Washington. While the report said that there was no serious shortage of scrap from a national defense viewpoint, it did not overlook the possibility of future developments. Now, however, according to testimony given the House Military Affairs Committee, the War Department considers that from a defense standpoint such legislation is unnecessary.

The Navy Department likewise urged enactment of scrap licensing legislation in 1937. Today, like the War Department, it expresses mild interest but does not go to the extent of recommending Congressional action.

There have been many indications that the Administration's foreign policy has been in a transition period during recent months, as evidenced by the abrogation of the treaty of trade and commerce with Japan, yet an analysis of the change has not enhanced the chances of scrap licensing proposals.

Fixture Manufacturers Use Pre-Coated Finishes to Speed Production and Reduce Costs

STAMPINGS made from pre-coated Thomastrip are produced at greater speeds and lower costs. Deep drawing and forming operations are aided. Finishing and handling operations are simplified. Buffing and polishing are reduced—often eliminated. Electro coatings applied to cold strip at the Thomas Mill will not crack, peel nor flake—they offer a short-cut to high quality production of finished parts.

THE THOMAS STEEL COMPANY
WARREN · OHIO

STEELS THAT STIMULATE PROGRESS

BRIGHT FINISH UNCOATED, AND ELECTRO COATED WITH NICKEL, BRASS, COPPER, BRONZE, ZINC AND TIN

Government Orders

WASHINGTON—Iron and steel contracts for the week ended Feb. 10 totaled $628,681, as reported by the Division of Public Contracts, Department of Labor, while contracts for non-ferrous metals and alloys amounted to $224,589 and machinery awards were $595,616. Details follow:

Iron and Steel Products

Air Associates, Inc., Garden City, N. Y., War Air Corps; mooring kits	$88,806
Gillette Safety Razor Co., Boston, War CCC; safety razors	14,280
Camden Forge Co., Camden, N. J., Navy S & A; training circle racks	137,500
The Carpenter Steel Co., Reading, Pa., Navy S & A; steel	23,925
Allegheny Ludlum Steel Corp., Brackenridge, Pa., Navy S & A; steel	43,970
Jones & Laughlin Steel Corp., Pittsburgh, Navy S & A; angles and shapes	43,053
York Safe & Lock Co., York, Pa., Navy S & A; gun mounts	59,846
Lukens Steel Co., Coatesville, Pa., Navy S & A; plate steel	22,986
Republic Steel Corp., Cleveland, Navy S & A; plate steel	37,459
Columbia Steel & Shafting Co., Pittsburgh, War Ordnance; drawn steel	24,650
Smith & Wesson, Inc., Springfield, Mass., War Ordnance; revolver parts	15,502

Colt's Patent Fire Arms Mfg. Co., Hartford, War Ordnance; revolver parts 16,492
The Greene-Wolfe Co., Inc., Brooklyn, N. Y., War QMC; wrought iron pipe 21,408
Hedges-Walsh-Weidner Division of Combustion Engineering Co., Inc., Chattanooga, Tenn, War QMC; soil pipe 11,150
Harry C. Weiskittel Co., Inc., Baltimore, War QMC; gas ranges 44,950
Barnard Aviation Equipment Co., Inc., Newark, N. J., War Ordnance; rifle parts 11,342
Armco International Corp., Middletown, Ohio, War QMC; corrugated roofing 12,257

Non-Ferrous Metals and Alloys

Chase Brass & Copper Co., Inc., Waterbury, Conn., War CCC; soap boxes $26,520
Chase Brass & Copper Co., Inc., San Francisco, Navy Purchasing Office, copper-nickel tubing 21,648
The International Nickel Co., Inc., New York City, Navy S & A; nickel-copper alloy 31,435
Caswell, Strauss & Co., Inc., New York City, Navy S & A; pig tin.. 92,736
The International Nickel Co., Inc., New York City, Navy S & A; nickel 11,912
Reynolds Metals Co., Richmond, Va., Navy S & A; aluminum pigment.. 29,177
The American Brass Co., Waterbury, Conn., Navy S & A; brass 11,159

Other Machinery

Morse Chain Co., Detroit, Norfolk Navy Yard; diesel engine parts ... $36,121
The Buda Co., Harvey, Ill., Norfolk Navy Yard; diesel engine parts .. 13,158
Ex-Cell-O Corp., Detroit, Norfolk Navy Yard; diesel engine parts ... 152,426
Chandler-Evans Corp., South Meriden, Conn., Navy S & A; fuel pumps 35,754
Cincinnati Shaper Co., Cincinnati, Navy S & A; power press brakes.. 10,703
Gisholt Machine Co., Madison, Wis., Navy S & A; turret lathes 21,095
The Warner & Swasey Co., Cleveland, Navy S & A; turret lathes 26,585
Henry Prentiss & Co., Inc., New York City, Navy S & A; boring machine 24,293
Smith-Courtney Co., Richmond, Va., Navy S & A; drop hammer 11,500
James B. Lambie Co., Washington, D. C., Navy S & A; twist drills .. 13,213
The Spencer Turbine Co., Hartford, Procurement; vacuum cleaners....Indefinite
The Aldrich Pump Co., Allentown, Pa., War Ordnance; hydraulic pumps 23,360
The Sebastian Lathe Co., Cincinnati, War QMC; lathes 16,260
Seeger Refrigerator Co., St. Paul, War QMC; refrigerators 74,276
General Electric Supply Corp., Washington, D. C., War QMC; refrigerators 104,910
R. G. LeTourneau, Inc., Peoria, Ill., Procurement; machinery parts ...Indefinite
Electric Vacuum Cleaner Co., Inc., Cleveland, Procurement; vacuum cleaners .....Indefinite
The Sweeper Vac Co., Worcester, Mass., Procurement; vacuum cleaners .....Indefinite
The Producto Machine Co., Bridgeport, Conn., War Ordnance, routing machines 18,000
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y., War QMC; jib cranes 13,960

Navy Awards

WASHINGTON—The Navy Department's Bureau of Supplies and Accounts has awarded contracts to these companies:

Aero Spark Plug Co., Inc., New York City, spark plugs, $76,176; Leland-Gifford Co., Worcester, Mass., bench type drills, $9,930; Babcock & Wilcox Tube Co., Beaver Falls, Pa., boiler tubes, $11,701; Sidney (Ohio) Machine Tool Co., lathes, $19,680; Babcock & Wilcox Tube Co., New York City, boiler tubes, $24,719; and the following contracts for welding electrodes: Harnischfeger Corp., Milwaukee, $19,307; Hollup Corp., Chicago, $42,250; Reid-Avery Co., Baltimore, $158,246; Una Welding, Inc., Cleveland, $28,890.

U. S. Steel Export Will Sell Champion Electrodes

CLEVELAND — Arrangements were concluded last week whereby United States Steel Export Co. will handle the sale of Champion welding electrodes in foreign countries, according to Pierre Champion, president of Champion Rivet Co., of Cleveland.

Except for order filling purposes, the United States Steel Corp. subsidiary has not handled welding electrodes previously. Present distribution arrangements of the Champion Co. in France and Canada will remain unchanged.

The export market for welding electrodes has been constantly widening in recent years. Other makers have somewhat similar arrangements with steel company export departments. Champion went into the electrode field about 10 years ago as an addition to its rivet lines.

Your Electric Hoists Should Be "Shaw-Box"!

...They Cost Less To Operate

7 Reasons Why

Only in Shaw-Box Hoists can you get these features that make them the most economical hoists to use, and for the work they do the least expensive to buy.

1 — "One-Point" Lubrication System
2 — Interchangeable Suspension
3 — "Fool Proof" Upper Stop
4 — Two-Gear Reduction Drive
5 — "Hyatt" Roller Bearings
6 — Totally Enclosed Construction
7 — Ball Bearing Motors

Shaw-Box Electric Hoists are doing the lifting in thousands of plants across the country, in all industries — lifting jobs like yours . . . Always they have speeded production, taken the burden from men, lowered costs and increased profits.

In the Shaw-Box line of Electric Hoists you will find the one you seek for your own necessities . . . Sizes range from 250 pounds to 20 tons lifting capacity in combinations and arrangements to meet every requirement of industry . . . Back of them are the hoisting experiences of operating men in thousands of plants in all industries, and, the experience of more than half a century devoted to the development and manufacture of cranes and hoists exclusively.

Send for catalog that contains complete information and many illustrations of profit making installations that may suggest an application to you.

Makers of all types and sizes of Electric and Hand Operated Cranes, and Electric Hoists, including the famous Portable Electric "Budgit" Hoists . . . ***Send all your inquiries for cranes and hoists to "Shaw-Box"!***

SHAW BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
402 Broadway MUSKEGON, MICHIGAN

F. M. Robbins Honored at Annual Steel Founders Society Meeting

CHICAGO—Nearly 200 steel foundrymen attended the annual meeting of the Steel Founders Society of America at the Edgewater Beach Hotel here last week. Frank M. Robbins, Ross-Meehan Foundry, Chattanooga, Tenn., and retiring president of the society, was awarded the Frederick A. Lorenz Memorial medal for outstanding contributions to the industry.

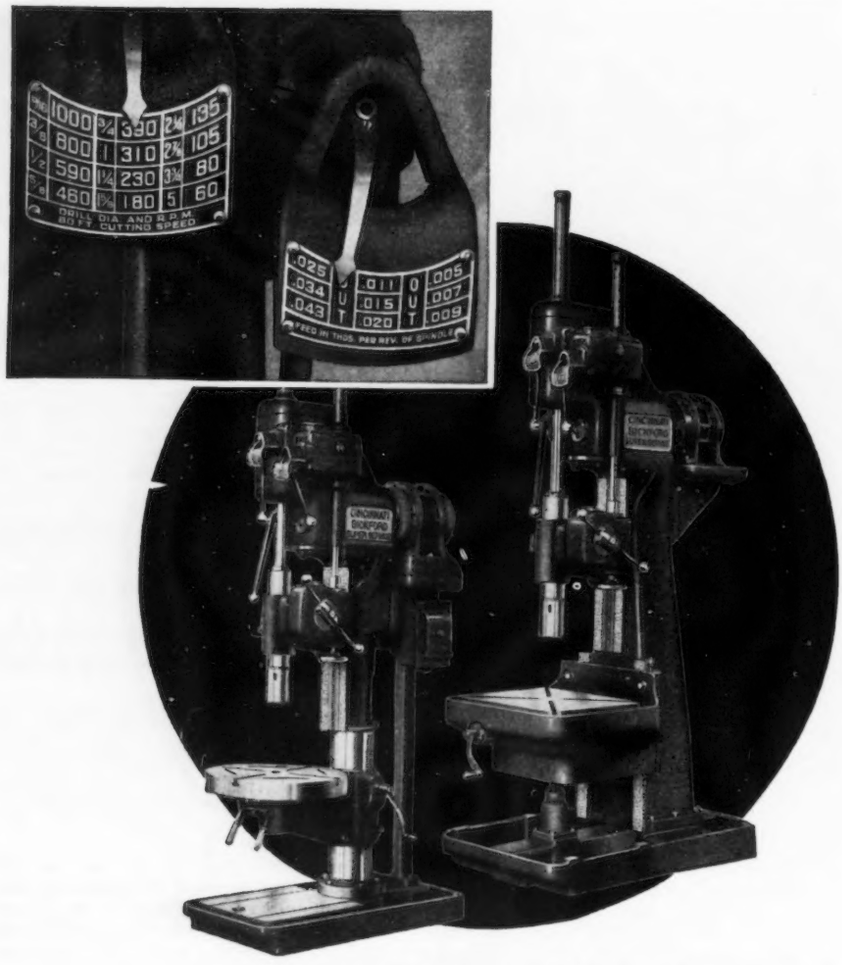
Problems facing the industry were discussed by Oliver E. Mount, American Steel Foundries, Chicago. Kenneth F. Ode, Falk Corp., Milwaukee, presented some ideas with regard to training apprentices for the small and medium sized steel foundry, after which industry sales promotional ideas were offered by Paul H. Harlan, Electric Steel Castings Co., Indianapolis.

Charles W. Briggs, technical adviser of the society, announced a series of lectures on the principles of electric steel melting to be held at Battelle Memorial Institute, Columbus, Ohio, March 21 to 23, 1940. Arranged primarily for electric furnace melters and helpers, the program will include the following lectures: "Electric Steel Melting Furnaces," N. R. Stansel, General Electric Co., Schenectady; "Carbon and Graphite Electrodes," T. L. Nelson, National Carbon Co., Cleveland; "Raw Materials," Adolph Scheid, Jr., Columbia Tool Steel Co., Chicago Heights, Ill.; "Fundamentals of Chemistry of Steel Making," C. H. Herty, Jr., Bethlehem Steel Co., Bethlehem, Pa.; "Application of Chemistry to Acid and Basic Practice," C. E. Sims, Battelle Memorial Institute; "Electric Power and Its Economical Use," H. W. Gillett, Battelle Memorial Institute; "Operation Methods," C. W. Briggs; "Fluidity and Temperature Measurements," C. H. Lorig, Battelle Memorial Institute; "Tapping and Metal Transfer," C. W. Briggs; and "Refractories and Furnace Linings," L. S. Fry, Joslyn Mfg. & Supply Co., Fort Wayne, Ind.

A job evaluation and employee rating plan which has already been successfully installed in more than 100 plants ranging from 25 to 2000 employees and covering anywhere from 10 to 450 jobs was explained by A. L. Kress, director of industrial relations, National Metal Trades Association, Chicago.

J. A. Westover, Burnside Steel Foundry Co., Chicago, addressed the meeting on the subject of grinding wheels, giving four steps in the securing and maintaining of low grinding wheel costs. First, equipment must be kept in good condition and free of vibration; second, only those parts of the casting that cannot be cleaned otherwise should be ground; third, a fast metal removing wheel should be selected, that is, one with a low ratio of wheel loss to metal removed; and lastly, the grinder should be educated in the use of the wheel and an incentive plan should follow up this instruction to see that he uses his teachings.

By the use of slides and charts, Walter S. Giele, Lebanon Steel Foundry, Lebanon, Pa., explained methods and equipment involved in the reclaiming of foundry sand. Charles W. Briggs discussed "Hot Tear Formation in Steel Castings" in his technical paper.



MORE HOLES PER DOLLAR
***from* SUPER SERVICE UPRIGHTS**
21" 24" 28" All Geared

SUPER C B SERVICE

A wide range of useful drilling speeds and feeds, instantly available by direct reading single lever control, promotes rapid and efficient operation. Write for Bulletin U-25 giving full particulars.

THE CINCINNATI BICKFORD TOOL CO.
OAKLEY CINCINNATI OHIO U.S.A.

1200 Study Job Problems At 3-Day Management Conference

CHICAGO—More than 1200 industrial relations and personnel men attending the three days' annual personnel conferences of the American Management Association, last week, heard discussions on "Leadership in Employee Relations," "Putting Psychology to Work," "Conciliation Experience," and "Fundamentals of the Personnel Job." The theme of the meeting, "Men *Plus* Management," rather than "Men *Versus* Management," was expressed by J. Walter Dietz, personnel relations manager, Western Electric Co., New York, who presided at the opening session.

W. A. Patterson, president, United Air Lines, declared that management should assume the same responsibility toward employees as toward stockholders while Harold F. North, industrial relations manager, Swift & Co., urged his audience to regard industrial relations as a way of life, and not merely as a gesture. It is a daily problem, he declared, and not something to think about only in crises.

A Good Personnel Man

The characteristics of a good personnel man, said Mr. North, are: He should be fair and impartial, should have no axe to grind, should be fearless, able to diagnose situations correctly, and to make reasonably prompt decisions, be able to change his attitude toward a situation when warranted by the facts, and free from stubborn pride of opinion.

R. R. Zimmerman, Federal Council of Personnel Administration, said that a personnel worker should never feel his work is being weakened when management is asked to participate.

"It is for him to imbue his organization with the belief that the brains and cooperation of labor when tapped by management increase industrial efficiency, lower costs and generally help to make our economic system work better," Mr. Zimmerman said.

Discussing a test program in an industrial company, H. C. Taylor, psychology research section, Western Electric Co., Chicago, said that tests are not foolproof, but are only a means of increasing a company's batting average with respect to hiring the right man for the right job.

Strong Unions Defended

Phillips L. Garman, director of research, International Printing Pressmen & Assistants' Union of North America, said that until management takes the presence and influence of unions for granted, negotiations will never be as successful as they might be. Mr. Garman declared that workers do not fear technological improvements when their labor organization is powerful for they know then that their welfare will be considered.

Misunderstanding is the largest factor in serious labor disputes, according to J. R. Steelman, director of conciliation, Department of Labor. Industry must train its own men if it desires valuable skilled labor, L. D. McDonald, vice-president, the Warner & Swasey Co., Cleveland, said as he traced the gradual disappearance from the industrial scene of skilled workmen. In May, 1935, Warner & Swasey began to

AMONG COAL HANDLING BRIDGES
THERE IS A NEW LIGHTWEIGHT CHAMPION!

● The low initial price and correspondingly favorable operating costs of this coal bridge resulted from the use of a special rope reeving scheme and a cantilevering shuttleboom. Together, these made possible a substantial saving in structural weight.

Built for The Kokancoal Company of Brooklyn, this bridge handles 200 tons of coal per hour. With an operating length of 330′ and a longitudinal travel of 600′, it serves an area of more than 4½ acres. This coverage is obtained with a structure of only 140 tons, or about 2/3 of the weight usually required for this extent of service.

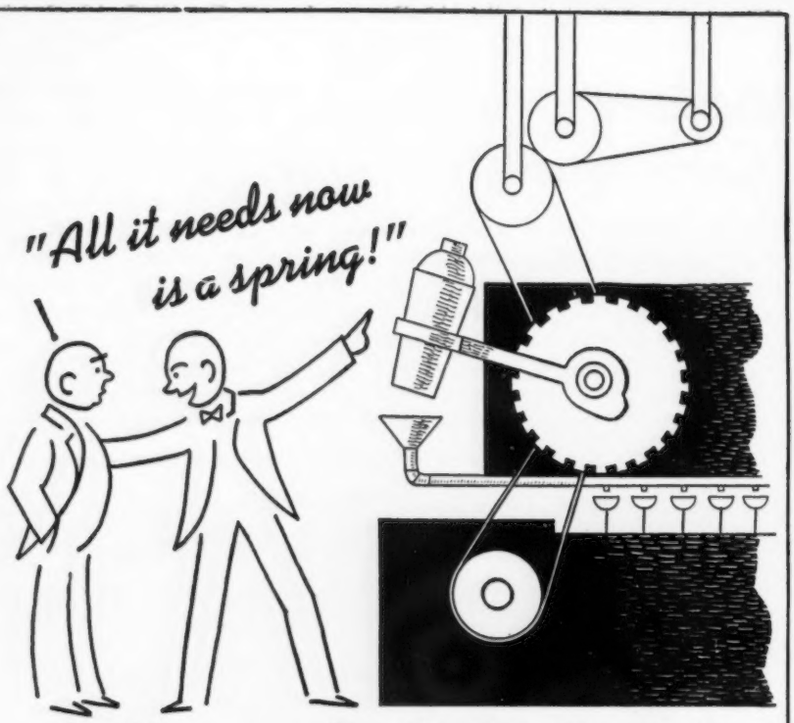
The special reeving arrangement prevents the ropes from running through the bucket sheaves during trolley travel. This allows a weight saving design, since the hoisting mechanism can be mounted on the main structure without the excessive rope wear experienced with rope reeving rigs of conventional design.

A main structure span of only 180′ gives a yard coverage of 330′. Over the the dock, 90′ is covered by the cantilever action of the shuttleboom. On the opposite end the shuttleboom cantilever is 60′. The trolley and bucket move at 600′ per minute along the shuttleboom. Simultaneously, the shuttleboom traverses the main frame at equal speed. In this way the 2½ ton bucket attains a travel speed of 1200′ per minute.

This rig was designed, fabricated and erected by Dravo. We gladly consult on any problem involving materials handling equipment.

DRAVO CORPORATION
ENGINEERING WORKS DIVISION

SHIPYARDS: PITTSBURGH, PA.—WILMINGTON, DEL.
GENERAL OFFICES AND SHOPS: NEVILLE ISLAND—PITTSBURGH, PA.



Better see **DUNBAR BROS. COMPANY**
DIVISION OF ASSOCIATED SPRING CORPORATION
BRISTOL, CONNECTICUT
"They've been making quality springs for nearly one hundred years"

Have You a Hot Rolling Problem?

Where careful metallurgical control and skilled work is required on ferrous and non-ferrous alloys—our services can be of real value to you.

We are expertly equipped to hot roll any metal into bars, rods and flats on a contract or toll basis.

We can handle ingots or billets up to about 6" x 6" and hot roll to as small as 1/4" diameter in coils. Also a wide variety of square and flat sizes.

SEND US YOUR PROBLEM!

WILBUR B. DRIVER CO.
NEWARK, NEW JERSEY

Melters and Manufacturers of "TOPHET" Resistance Wires—Nickel Chrome Alloys—Copper Nickel Alloys—Pure Nickel and Monel Wire and Strip—Stainless Steel Rods and Wire.

hire recent graduates of technical high schools subjecting them to regular training courses. Since that time, Mr. McDonald said, 500 learners have been taken in, more than 250 have become skilled men, and 165 are still in the training period. At the same time, young men engaged in unskilled work are constantly being encouraged to prepare for the learners' group by studying in night school.

Industry Must Educate

Most men who seek supervisory positions fail to obtain sufficient education in school, which means, according to Mr. McDonald, that industry must create its own skilled working and supervisory forces.

F. E. Searle, superintendent, Henry Ford Trade School, Dearborn, Mich., told how Ford operates three schools with nearly 6000 students, thus making available at all times a supply of skilled labor from which to draw. Most of the students when leaving the school work for Ford, but neither party is obliged to bring about this relationship. Foreman training is an important duty of the personnel department, according to R. D. Hays, supervisor of training, American Rolling Mill Co., Middletown, Ohio, especially when the training is along the lines of teaching how men should be handled and how ideas can be sold to the workmen.

Westinghouse Salaries Rise to 10% above Base

WAGES and salaries of all employees of the Westinghouse Electric & Mfg. Co. will be adjusted upward 10 per cent from base rates this month in accordance with the Westinghouse wage and salary plan, under which the amount of compensation is established each month in proportion to the average earnings of the company in preceding three months.

Russia Building More Blast Furnaces

LONDON—The Commissariat of the Russian Metallurgical industry is building four new blast furnaces for the Magnitogorsk Combine, Azovstal, the Nizhny Tagil Works, at the Orjonikidze Metallurgical Works in Zaporozhe (Ukraine). The designed capacity of each of the furnaces is about 1400 tons of pig iron per day. The total estimated cost of each is 35,000,000 rubles.

Industrial Pioneers Honored on 150th Patent Office Anniversary

RECOGNITION of the achievements of close to 300 "Modern Pioneers" of industry was taken in the past week by the Modern Pioneers Committee of the National Association of Manufacturers in observance of the 150th anniversary of the founding of the American patent system. These pioneers, eminent scientists, inventors and industrialists, were selected by a committee consisting of Karl T. Compton, president, Massachusetts Institute of Technology; Forest R. Moulton, secretary, American Association for Advancement of Science; George B. Pegram, dean, Graduate Faculties of Columbia University; John T. Tate, dean, College of Science, Literature and the Arts, University of Minnesota; Edward R. Weidlein, director, Mellon Institute, and Frank C. Whitmore, dean, School of Chemistry and Physics, Pennsylvania State College.

Nominations for the Modern Pioneer Awards were made by manufacturers, executives of manufacturing trade associations, and members of professional and engineering societies. The requirements for nomination were that the nominee must have "discovered or invented an art, machine, manufacture or composition thereof, upon which the United States Patent Office has issued a patent within the past 25 years." It was further required that the use of the patent must have "increased employment, or provided a new commodity or service, or reduced the cost of a product already in use or improved the quality of a product already in use."

Men prominent in the metal working industry honored as "Modern Pioneers" at various regional meetings in the past week are:

Baltimore District

George H. Emerson, Baltimore & Ohio Railroad; Gustave Fast, Fast Bearing Co.; Alexander L. Feild, Rustless Iron & Steel Corp.; James Myer, Timber Engineering Co.; J. J. Tatum, Baltimore and Ohio Railroad, and Karl Turk and Richard Turk, Porcelain Enamel & Mfg. Co.

Boston District

Roger W. Andres, Riley Stoker Co.; J. H. Ashbaugh, Westinghouse Electric & Mfg. Co.; H. M. Barber, C. B. Cottrell & Sons Co.; R. M. Dugdale, Farrington Mfg. Co.; E. R. Fellows, Fellows Gear Shaper Co.; T. Larson, Norton Co.; E. M. Lines, Bird & Son, Inc.; A. J. Loepsinger, Grinnell Co.; C. E. Mason, Foxboro Co.; E. R. Wolfert, Westinghouse Electric & Mfg. Co.

Chicago District

H. F. Barber, Barber-Greene Co.; D. P. Davies, J. I. Case Co.; Walter Geist, Allis-Chalmers Mfg. Co.; Sern Madsen, Curtis Companies, Inc.; Ira E. McCabe, Mercoid Co., G. E. Meyercord, Haskelite Mfg. Corp.; R. C. Newhouse, Allis-Chalmers Mfg. Co.; C. G. Olson, Illinois Tool Works; L. R. Smith, A. O. Smith Corp.; H. H. Wermine, Belden Mfg. Co.; Dr. W. M. White, Allis-Chalmers Mfg. Co.

Cincinnati District

W. R. Chapin, E. C. Atkins & Co.; W. A. Chrusy, Delco-Products Division, General Motors Corp.; Weston Miller, W. J. Savage Co.; H. D. Geyer, Inland Mfg. Division, General Motors Corp.; W. F. Groene, R. K. LeBlond Tool Co.; H. B. Hull, Frigidaire Division, General Motors Corp.; E. A. Miller, King Machine Tool Co.; John B. Tytus, American Rolling Mill Co.; Norman H. Gilman, Allison Engineering Division, General Motors Co.; R. N. Falge and C. A. Michel, Guide Lamp Division, General Motors Corp.

Detroit District

C. S. Ash, Differential Wheel Corp.; R. L. Beers, Detroit Stoker Co.; C. Breer, Chrysler Corp.; D. J. Campbell, Campbell, Wyant & Cannon Foundry Co.; T. P. Chase, General Motors Corp.;

H. A. BRASSERT & COMPANY

ENGINEERS AND CONTRACTORS

Offer to the Industry a Specialized Service in Design and Construction, a Service based on long and wide experience by a complete organization

THIS experience provides an intimate knowledge of principles and practices of metallurgical processing and material handling.

It makes available skilful mechanical engineering in accordance with the constantly changing and improving standards of today.

It assures the use of approved methods for rapid, accurate and economical execution of construction.

These three essentials for complete readiness to serve are possessed in an exceptional degree by the Brassert organization.

H. A. BRASSERT & COMPANY

310 SOUTH MICHIGAN AVENUE • CHICAGO, ILLINOIS

60 EAST FORTY-SECOND STREET • NEW YORK CITY

KOPPERS BLDG. • • PITTSBURGH, PENNSYLVANIA

GRANITE HOUSE, CANNON ST., E. C. 4 • LONDON

K. W. Connor, Micromatic Hone Corp.; S. I. Fekete, Hudson Motor Car Co.; A. J. Fisher, General Motors Corp.; Henry Ford, Ford Motor Co.; C. E. Johnson, Sealed Power Corp.; C. F. Kettering, General Motors Corp.; H. C. Mougey, General Motors Corp.; M. Olley, Rolls Royce, Ltd.; F. M. Reid and J. W. Votypka, Fruehauf Trailer Co.; W. F. Rockwell, Timkem-Detroit Axle Co.; Thomas A. Boyd, General Motors Corp.; (joint award) William T. Dunn, O. E. Fishburn, E. R. Maurer, George McCain, C. A. Neracher, W. F. Ploetz and David A. Wallace, all of Chrysler Corp.; (joint award) L. L. Beltz, R. N. Brown, J. M. Christman, J. R. Ferguson, W. R. Griswold, C. R. Paton, M. Tibbetts, J. G. Vincent and M. Ware, all of Packard Motor Car Co.; C. E. Summers, and T. C. Van De Grift, Research Laboratories Division, General Motors Corp.; (joint award) J. O. Almen, O. K. Kelley, E. A. Thompson, General Motors Corp.

Hartford District

F. H. Banbury, Farrel-Birmingham Co., Inc.; A. F. Breitenstein, Geometric Tool Co.; E. P. Bullard, Jr., Bullard Co.; Frank W. Caldwell, Hamilton Standard Propellers Division, United Aircraft Corp.; T. E. Dunn, Bullard Co.; G. G. Going, Remington Rand, Inc.; Frederick G. Huges, New Departure Division, General Motors Corp.; Erle Martin, Jr., Hamilton Standard Propellers; K. E. Peiler, Hartford-Empire Co.; J. C. Shaw, Pratt & Whitney Division, Niles-Bement-Pond Co.

Philadelphia District

Dr. E. F. Northrup, Ajax Electrothermic Corp.; D. C. Prince, General Electric Co.; W. K. Rankin, General Electric Co.; Henry Frederick Schmidt, Westinghouse Electric & Mfg. Co.; Dr. Vladimir Kosma Zworykin, Electronic Research Division, RCA Mfg. Co., Inc.; (joint award) H. S. Campbell, Agnew E. Larsen, H. F. Pitcairn and P. H. Stanley, all of Autogiro Co. of America.

St. Louis District

Burns Dick, Wagner Electric Corp.; L. C. Hewitt, Laclede-Christy Clay Products Co.; Alfred M. Lane, Monarch Metal Weatherstrip Corp.; W. D. Moore, American Cast Iron Pipe Co.; E. S. Pillsbury, Century Electric Co.; Erskine Ramsay, Alabama By-Products Corp.; L. J. White, Southern Steel Co.

Rochester District

C. A. Campbell, New York Air Brake Co.; W. H. Carrier, Carrier Corp.; A. A. Criqui, Buffalo Forge Co.; R. R. Ridgway, Norton Co.; S. N. Wight, General Railway Signal Co.; (joint award) J. E. Gleason and E. Wildhaber, Gleason Works.

On Feb. 27, "pioneers" in the New York district will receive their awards at a dinner at the Waldorf-Astoria Hotel. At the same time a small group of "pioneers," whose achievements are particularly outstanding, will receive special honors.

Belgian Steel Output Gained in December

BELGIAN steel production totaled 318,000 tons in December, against 281,000 in November and 255,000 in October. Belgium's record steel output figure was achieved in 1929, when the monthly average was 342,000 tons. The recent rise is due to the practical elimination of British and German competition.

Belgian steelmakers, nevertheless, are worried by the fact that their prices are above Anglo-French levels and are exceeded only by American. This is due to high taxes, wages, and coal prices.

Westinghouse Salaried Men Back Inside Union, 2136 to 81

PITTSBURGH—Salaried workers at Westinghouse Electric & Mfg. Co.'s East Pittsburgh works last week chose the Association of Westinghouse Salaried Employees as their collective bargaining agent. Statistics on the election ordered and supervised by the NLRB were as follows: 2828 employees were eligible to vote, 2219 voted, 2136 favored the Association of Westinghouse Salaried Employees, 81 opposed the association, one ballot was void and one ballot blank.

An Assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas-designed, Atlas-built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket *rolls down* to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket *rolls down* to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers CLEVELAND, OHIO Manufacturers

serving the world with mobile handling equipment

Canadian War Orders to Be Placed on a Larger Scale

TORONTO—Additional war orders involving many millions of dollars are pending and will be placed without delay, according to official information from Ottawa. The new business will be placed on behalf of the Canadian and British governments. Confirmation is given regarding placing of $30,000,00 contracts for airplanes with Canadian Associated Aircraft, Ltd., by the British Government. In addition it is stated that some $25,000,000 additional orders for aircraft are to be placed for the Canadian National Defence Forces. About $10,000,000 worth of these machines will be awarded to Canadian companies, divided equally between Ontario and Quebec plants.

While official anouncements has not yet been made, it is stated that the British government is arranging to place orders with two Canadian companies for anti-tank guns.

In addition to contracts for anti-submarine vessels of the "whale catcher" type, formerly announced, orders this week have been confirmed to British Columbia shipyards to the value of $6,500,000. Yarrows, Ltd., Esquimalt, B. C., and Victoria Machinery Depot, Ltd., Victoria, each received orders for three vessels to cost $600,000 each. Burrard Drydock Co., Ltd., Vancouver, received orders for four "whale catchers" and other naval work, of a total value of $4,000,000.

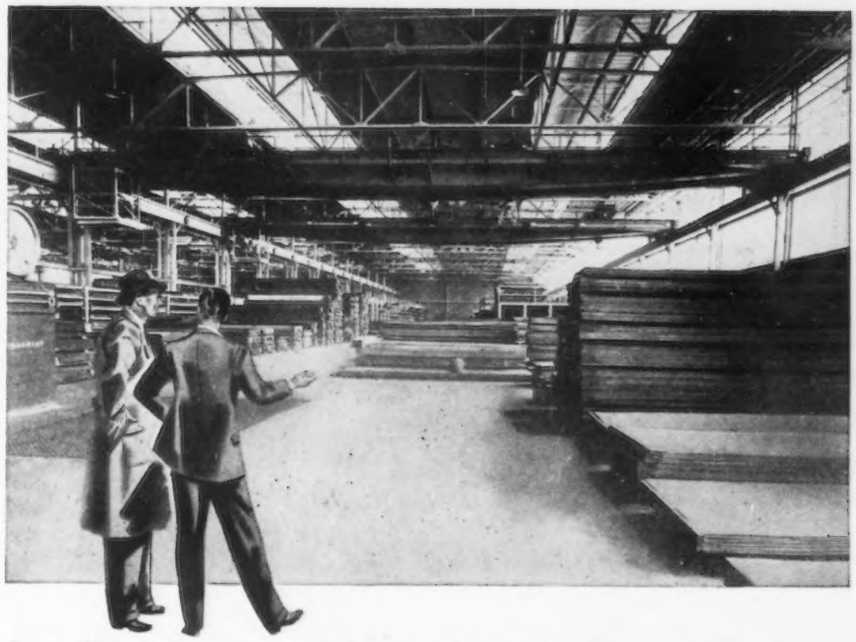
Orders placed by the War Supply Board, Ottawa, during the week, had a value of $3,307,166, according to Transport Minister Howe. Aircraft supplies made up the bulk of the contracts and included $2,191,720 to Fleet Aircraft, Ltd., Fort Erie, Ont.; British Air Ministry, $336,400 and British Aeroplane Engines, Ltd., Montreal, $130,316. Williams & Wilson, Ltd., Montreal, received machinery order valued at $24,058.

Placing of war contracts on a broader scale has had a stimulating effect on demand for products of the iron and steel industry and backlogs reported at the beginning of the year by primary producers have been augmented by millions of dollars. The placing of munitions, guns, ships and airplane orders, has resulted in a more diversified demand on the mills and the capacity operating schedules that have been in effect since the outbreak of war are assured of continuation for the remainder of this year at least. Demand for ship plates and other steel materials of this nature featured steel markets during the past week or two and with all Canadian capacity booked well into the future upward of 10,000 tons of steel orders have been placed in the United States with other larger orders to follow almost immediately, according to Canadian steel interests.

From unofficial but reliable sources, it is learned that General Motors Corp., of Canada, has closed or is negotiating for large government orders for the production of vehicles for war purpose, between a tank and a truck, which will be turned out at the Oshawa, Ont., plant. On this account it is stated that starting in the early future Canadian demand for passenger cars, especially the Chevrolet cars, will be brought in from the

Sheets...Yes

...AND SOMETHING MORE



One call for information will prove your nearby ARMCO Distributor is far more than an order-taker. He knows sheet metal; he can be of exceptional service in helping you select the right metal for the right purpose. And supporting him are complete research facilities of The American Rolling Mill Company.

Your ARMCO Distributor has ample stocks of iron and steel sheets, including galvanized ARMCO Ingot Iron. Many also carry ARMCO Stainless Steel and ARMCO PAINTGRIP—the galvanized sheet that takes and holds paint.

If you don't know the nearby ARMCO Distributor, use this opportunity to get acquainted. Write us for his address. Then you'll have a top-notch source for quick delivery of the kind of sheet metal you need. The American Rolling Mill Co., 521 Curtis St., Middletown, Ohio.

ARMCO

Call

THE ARMCO DISTRIBUTOR

United States, and assembly here be temporarily discontinued. The swing over to the tank-truck production, will in turn result in more extensive purchases of sheets, plates and other materials, from Canadian producers and also will increase imports.

Leaders in the building trades now are looking forward to a record year. While much of the optimism is based on war business, industrial expansion programs and other building projects are planned on a large scale. Demand for reinforcing steel and structural shapes is showing favorable improvement. Structural steel orders pending include 3,500 tons for 10 story office building in Toronto for Hydro-Electic Power Commission of Ontario; 700 tons for buildings for Verdun Protestant Hospital, Verdun, Que. Approximately 500 tons of reinforcing steel will be required for University building at Vancouver, B.C., for Department of Public Works, Victoria, B.C.

FOR HEAVY DUTY Forgings...
Quality IS IMPORTANT!
AND forge shop operators the world over are recognizing the importance of quality in forgings vital for heavy duty machines by selecting Erie Steam Drop Hammers on which to make them . . . It will pay you to investigate thoroughly the design and construction of Erie Steam Drop Hammers before making your selection of new equipment for your forge shop. Write for Bulletin No. 333 giving full details on the complete Erie line.
ERIE
Above is illustrated a 10,000 pound Erie Steam Drop Hammer with rigid frame mounting and piston type motion valve. Erie Steam Drop Hammers are built with rated capacities from 400 pounds up to 75,000 pounds.
ERIE FOUNDRY COMPANY
ERIE, PENNSYLVANIA, U.S.A.
DETROIT 335 Curtis Bldg.
CHICAGO 549 Washington Blvd.
INDIANAPOLIS 335 Postal Station Bldg.
FRANCE Fenwick, S. A.
CANADA John Bertram & Sons Co. Ltd.
ENGLAND Burton, Griffiths & Co., Ltd.
ERIE BUILDS Dependable HAMMERS

. . . GREAT BRITAIN . . .

. . . Strong export demand for sheets and tin plate

LONDON, Feb. 20 (*By Cable*)—British home steel demand is still taxing works to full capacity, with armaments and shipbuilding calling for large tonnages. Makers are generally accepting only priority orders so that delays in deliveries of commercial business extend over many weeks.

Imports of semi-finished steel from the Continent are increasing, but tin plate and sheet makers complain that distribution is unequal and some are hard pressed for supplies. Smoother working is expected in a few weeks.

There is a strong overseas demand for British tin plate and sheets, but licenses are issued sparingly except in cases where tin plate will return here as containers for essential commodities.

Steel scrap supplies are still inadequate, and some works are unable to keep all furnaces regularly working.

World steel output last year is estimated at 135,000,000 tons.

Belgian and Luxemburg plants are still busy with home defense orders and delays on new deliveries extend to 10 weeks.

Iron Ore Is Germany's Most Serious Deficiency

LONDON—It is understood that iron ore constitutes Germany's most serious deficiency in the present war, as it is a deficiency which cannot be made up by drawing upon the neighboring neutral territory. German iron ore requirements in 1938 were about 33,000,000 tons. Of this, nearly 9,000,000 tons was imported from Sweden and 2,500,000 from South-Eastern Europe (Jugoslavia) and Belgium. Other supplies came from France, Spain, North Africa, and Newfoundland, most of which is now either entirely cut off or seriously hampered by the British blockade.

New Sintering Plant For National Tube Co.

LORAIN, Ohio—National Tube Co. is building here a new sintering plant for reclaiming iron ore from blast furnace dust. Approximate capacity will be 200,000 net tons a year. Fabricated steel for the buildings is to be furnished by American Bridge Co. and certain mill equipment is to be supplied by American Oil Reclamation Co., Chicago.

$146,000,000 for Steel Plant Equipment

STEEL companies expect to spend nearly $146,000,000 for new equipment during 1940, according to information furnished to the American Iron and Steel Institute by 150 companies representing over 95 per cent of the steel-making capacity of the industry. The total amount budgeted by steel companies for plant modernization this year is more than was spent in either of the preceding two years, and brings the total spent or to be spent for new equipment since 1934 above a billion dollars.

Early in 1939 steel companies estimated their new equipment expenditures for that year at $126,000,000, of which $121,000,000 is now reported as actually spent. The estimated expenditures for new equipment in 1940 represent an increase of about 20 per cent over the amount spent last year. A total of $140,000,000 was spent for new equipment in 1938.

Contemplated modernization expenditures for 1940 although above 1938 and 1939 are substantially below 1936 and 1937, when the totals were $216,000,000 and $320,000,000, respectively. Expenditures in that period were greater than average because the depressed level of operations in preceding years had made it advisable to postpone several large-scale modernization programs, including the construction of a number of large continuous mills.

Most of the major plant expansion programs undertaken recently have now been completed, and the modernization activity planned for the current year covers chiefly the purchase of new and up-to-date equipment to supplant or supplement older installations.

N. Y.-N. J. Chapter A.S.T.E. Elects W. T. Gray, Chairman

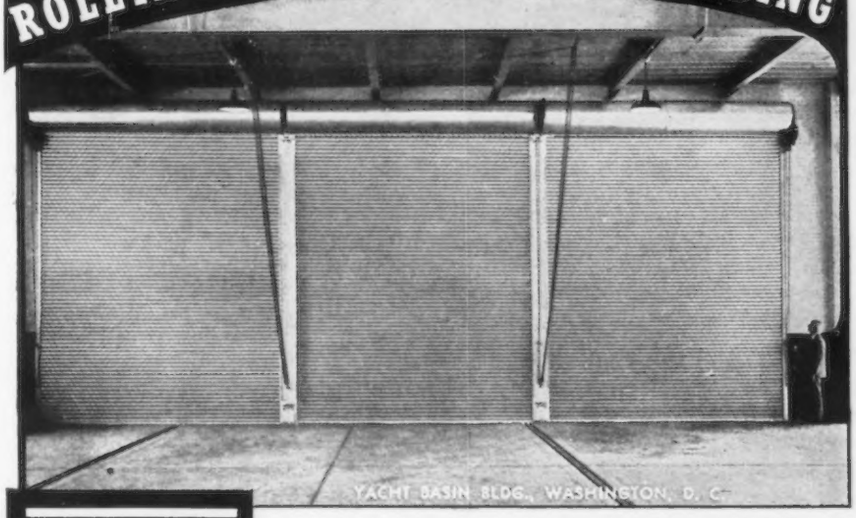
AT a meeting held at Newark, N. J., on Feb. 13, the New York-New Jersey chapter of the American Society of Tool Engineers elected as chairman Wallace T. Gray, assistant superintendent of Becton, Dickinson & Co., Rutherford, N. J. Mr. Gray, who has been chairman of the program committee, succeeds Herbert D. Hall. Other officers elected were: first vice-chairman, Frank J. Oliver, associate editor, THE IRON AGE; second vice-chairman, J. R. Ritzinger, mechanical engineer, American Safety Razor Co.; treasurer, Frank L. Delhagen, tool inspector, Western Electric Co.; and secretary, Ben C. Brosheer, *American Machinist*. The chapter now has about 290 members and is laying plans to be host for the annual meeting of the society to be held at the Hotel New Yorker, New York, March 7 to 9.

An interesting technical lecture on the selection and application of tool steels was given by F. R. Palmer, assistant to the president, Carpenter Steel Co., who illustrated his talk with numerous slides. He placed particular emphasis on the so-called personality or timbre of tool steels of identical specifications but having different performance characteristics during heat treatment.

Former Inland President Gives $1,660,000 to Hospital

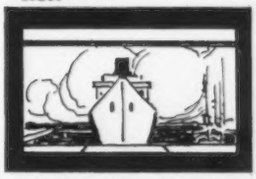
CHICAGO—George H. Jones, 84, one of the founders and former president of Inland Steel Co., has donated 20,000 shares of Inland stock, valued at $1,660,000, to the Wesley Memorial Hospital.

ROLLING UP THE SIDE OF A BUILDING



For small openings, each of the doors can be operated separately.

A two-door-wide opening can be cleared, on either side.



All three doors can be opened at one time—with center posts out of the way.

A TYPICAL KINNEAR SOLUTION TO A LARGE DOOR PROBLEM

Moving **yachts** in and out of a building requires a big doorway—but having to open a large door when only a small one is required, would waste time, money and labor—and heat in winter.

Kinnear solved the problem quickly! Three Kinnear Steel Rolling Doors were installed, with two center mullions that swing easily out of the way when required. The sketches at left show how the door equipment was thus made adaptable to almost any opening requirement.

All **other** advantages of Kinnear Rolling Doors are assured, too. Floor and wall space is saved . . . doors open easily all year around . . . their all-steel construction defies weather and intrusion, repels fire, resists wear . . . and Kinnear design means proved economy and durability.

You can get better results and cut door costs in your plant with Kinnear Rolling Doors. They're built in any size, for any opening, in old or new buildings, and with motor or mechanical control.

LET KINNEAR SOLVE YOUR DOOR PROBLEMS

KINNEAR ROLLING DOORS

SEND FOR THE NEW 1940 KINNEAR CATALOG

OFFICES AND AGENTS IN ALL PRINCIPAL CITIES

The KINNEAR Manufacturing Company

1760 - 1780 FIELDS AVE., COLUMBUS, OHIO

FACTORIES: SAN FRANCISCO, CALIF.; COLUMBUS, OHIO

. . . PERSONALS . .

WILLIAM A. BARR, who joined the Foote Brothers Gear & Machine Corp., Chicago, as works manager in 1929, has been elected president. Upon the resignation of F. H. FOWLER, former president, in November, 1939, Mr. Barr was elected executive vice-president and general manager. Before that he had been vice-president in charge of manufacturing for eight years.

❖ ❖ ❖

MARK A. GARDNER, for the past 11 years steel buyer for the W. Bingham Co., Cleveland jobber, has been appointed sales manager of the Wasmer Bolt & Nut Co., Cleveland. He has had an extended experience in the merchandising end of the mill supply business in Ohio and the South.

❖ ❖ ❖

S. H. WORRELL has been named sales manager of the Edgar T. Ward's Sons Co. in Detroit. Mr. Worrell has been associated with the steel industry for 20 years and is well known in the Detroit territory.

❖ ❖ ❖

IRA B. GROVES, manager of the St. Louis branch plant of the Ford Motor Co., has been named manager of the assembly branch at Kansas City, and J. C. DOYLE, has been named manager of the St. Louis branch. Mr. Groves succeeds W. L. YULE, who lost his life recently in an automobile accident near Carthage, Mo. Mr. Doyle was assistant manager of the St. Louis branch. Mr. Doyle has been assistant manager of the St. Louis Ford branch since 1938.

❖ ❖ ❖

LARRY N. SUCCOP has been appointed sales engineer, American Roller Bearing Co., Pittsburgh, to represent the company in the Southwest, with headquarters at Houston, Tex. Mr. Succop is a graduate of Carnegie Institute of Technology.

❖ ❖ ❖

ALBERT P. CRAIG, JR., has been appointed director of Westinghouse Electric & Mfg. Co.'s exhibit at the New York World's Fair. He was assistant director of the company's activities in 1939. Mr. Craig was graduated from Cornell University in 1927 with the degree of electric engineer and succeeds E. H. SNIFFIN, retired, both as exhibit director and as a member of the executive committee of the Fair Exhibitors' Association.

WILLIAM A. BARR, new president of Foote Brothers Gear & Machine Corp.

CARL F. OBERMAIER, who has been manager of the York, Pa., wire works of the General Electric Co., Schenectady, N. Y., has retired on pension, in accordance with the company's retirement policy. He is being succeeded by F. R. KAIMER, who has been his assistant for the past 10 years.

❖ ❖ ❖

CHARLES E. WILSON, vice-president since 1934, in charge of Pacific Coast operations of the Worthington Pump & Machinery Corp., Harrison, N. J., is moving his headquarters to the home office at Harrison, where he will direct the sales of products handled by the Carbondale division.

MARK A. GARDNER, new sales manager of the Wasmer Bolt & Nut Co.

❖ ❖ ❖

C. F. CHRISTOPHER, heretofore chief metallurgist for the American Locomotive Co., railway steel spring division, Latrobe, Pa., has been made chief metallurgist for the Steel Co. of Canada, Hamilton, Canada.

❖ ❖ ❖

GEORGE T. LADD, president and general manager, United Engineering & Foundry Co., and JOHN T. TIERNEY, president and chairman of the executive committee of the board of trustees, Koppers United Co., have been elected directors of Westinghouse Air Brake Co., Wilmerding, Pa.

❖ ❖ ❖

CLYDE HAUSE, sales engineer Gorham Tool Co., Detroit, was elected chairman of the Detroit chapter of the American Society of Tool Engineers at a meeting held recently in the new Carboloy Co. plant near Detroit. He succeeds C. W. THIEDE, chief tool engineer at the Chrysler Jefferson Avenue plant, who has served as chairman for the last year. At the same meeting B. L. DIAMOND, sales engineer, Consolidated Machine Tool Corp., Detroit, was elected vice-chairman and CLYDE MOONEY, tool engineer, Pioneer Engineering Co., was elected secretary.

❖ ❖ ❖

A. F. SCHROEDER, of the Wisconsin Axle Corp., Oshkosh, Wis., has been elected vice-president of the Fox River Valley Traffic Club.

❖ ❖ ❖

EDWARD REUM, superintendent of the Highway Trailer plant at Stoughton, Wis., for the past three years, has been appointed factory manager for the company in charge of plants at Stoughton and Edgerton. He succeeds LEE SICKLER, who has resigned.

❖ ❖ ❖

C. A. TROEDSON, Chicago district manager, U. S. Electrical Motors, Inc., presented "Underground Raindrops" a 40-min. talking motion picture showing the latest manufacturing methods in machining, winding and testing motors, before the February meeting of the Racine chapter, American Society of Tool Engineers.

❖ ❖ ❖

ROGER NEWBERRY, assistant manager of Ruston-Bucyrus, Ltd., Lincoln, England, an affiliate of Bucyrus-Erie

Co., South Milwaukee, has returned to the factory and will remain there because of a change in the manufacturing program of the English factory.

❖ ❖ ❖

H. E. HALL, general manager, Metal Disintegrating Co., Inc., Elizabeth, N. J., discussed "Powder Metallurgy" at a meeting of the Milwaukee chapter, American Society for Metals, Feb. 20.

❖ ❖ ❖

DR. JOHN T. RETALLIATA, engineer of the Allis-Chalmers Mfg. Co.'s steam turbine division, addressed the Milwaukee section of the American Institute of Electrical Engineers and the Edison Club, on gas turbines.

❖ ❖ ❖

BENJAMIN SCHWARTZ, vice-president of Schiavone-Bonomo Corp., Jersey City, N. J., was the recipient of an oil painting of himself by the artist David Immerman at a dinner given in his honor by the Sigma Alpha Mu fraternity, of which he was supreme prior until recently. The dinner was given at the Park Central Hotel, New York, on Feb. 15.

❖ ❖ ❖

H. H. YEAGER has been appointed assistant sales manager of the Shafer Bearing Corp., Chicago. Mr. Yeager was for a number of years district sales manager of the Dodge Mfg. Corp., Mishawaka, Ind., and prior to that was manager of the mill supply department of SKF Industries, Inc.

Steel Product Sales Office Opened By Williams & Kilsby

WILLIAMS & KILSBY, a partnership with offices in the Standard Oil Building, Los Angeles, has been formed by W. Woodward Williams, who recently resigned as general manager, Babcock & Wilcox Tube Co., Beaver Falls, Pa., and Perry Kilsby, sales representative on the West Coast for several companies manufacturing various steel products. These accounts, comprising the Babcock & Wilcox company, manufacturing seamless tubes in all leading grades and classifications; the Sivyer Steel Casting Co., Milwaukee, Wis., manufacturing return bend headers and tube supports in all grades; and William F. Klemp Co. of Chicago, manufacturing steel gratings and flooring, including Acme heavy duty floor steel, will now be represented on the West Coast by this partnership. In addition, Williams & Kilsby will represent exclusively in that territory Pittsburgh Crucible Steel Co.

. . . OBITUARY . . .

FRED W. SARGENT, retired president of the Chicago & North Western Railroad, died last week in Evanston, Ill., aged 63 years. Mr. Sargent had been president of the road for 14 years prior to his retirement last May.

❖ ❖ ❖

VITAL OUELLETTE, 73 years old, for 25 years president of the Grant Brothers Foundry Co., died Feb. 15 at his home in Grosse Pointe Park, Mich. He had lived in Detroit for 50 years. His first job in Detroit was as an iron molder for the Michigan Stove Co., which he later served as superintendent.

❖ ❖ ❖

FRED R. STILL, 73 years old, and for 53 years associated with the American Blower Corp. and its predecessor, Huyette & Smith Mfg. Co., died Feb. 15 on Long Island, N. Y. Mr. Still lived in Detroit until 15 years ago when he moved to New York. He was one of the founders of the Gold Cup motorboat races and was president of the American Power Boat Association from 1923 until 1930.

❖ ❖ ❖

C. LEO WENZEL, general sales manager of the Budd Wheel Co., Detroit, and widely known in the tire and truck industries, died Feb. 12 at Mayo Hospital, Rochester, Minn., where he had been a patient for two months. He was 42 years old. Mr. Wenzel, who lived in Grosse Pointe Farms, Mich., was associated with the Budd company for 20 years. He went to Detroit in 1926 when the firm moved its main plant from Philadelphia. He was past president of the Tire and Rim Association, governing body of the wheel industry.

❖ ❖ ❖

PETER H. NEBE, a pioneer of American tin plate production, died last week at his home in Gary, Ind., aged 78 years. Mr. Nebe was one of the first skilled workmen to engage in tin plate production in the United States when, in 1892 such activity was resumed following a 17-year period of idleness because of a high tariff on tin imports. His first position in this country was as tin house foreman in the old Demmlar works at McKeesport, Pa. In 1910 Mr. Nebe moved to Illinois where he worked as tin house superintendent for the Granite City Steel Co. until his retirement in 1920.

❖ ❖ ❖

ROBERT J. FRACKELTON, 71, president of Chandler & Price Co., Cleveland printing press manufacturer, died Feb. 10 in a Cleveland hospital. He had been head of the firm since 1912, having begun his career with it as secretary and treasurer in 1895.

❖ ❖ ❖

ROBERT J. HEISSERMAN, sales engineer for Link-Belt Co., died suddenly at his home in Philadelphia, Feb. 9. Mr. Heisserman started his Link-Belt career almost 30 years ago and for a number of years had been head engineer and engineering salesman for Link-Belt foundry conveyors and molding-sand preparation equipment throughout eastern territory.

❖ ❖ ❖

ALLEN R. HOFFER, of A. M. Wood & Co. Inc., Philadelphia, scrap iron and steel broker, died on Feb. 11, at his home in Lansdowne, Pa. For many years he was manager of the Philadelphia office of the Charles Dreifus Co. Then he operated his own company, but in recent years had been associated with A. M. Wood & Co. Inc. He was 63 years old.

Scrap Consumption Shade Lower in January

DOMESTIC consumption of iron and steel scrap in January totaled 3,775,000 gross tons, a fractional decline from the 3,805,000 tons melted in December, compared with 2,495,000 tons used in January, 1939, according to the Institute of Scrap Iron and Steel, Inc., New York.

Between 70 and 75 per cent of this scrap was melted in production of new steel, 20 per cent by foundries to make castings, and the remainder for miscellaneous requirements. The current ratio of domestic consumption of scrap to exports is about 18 to 1, according to the scrap institute.

2 of 5 Congressmen Are From Steel-Producing States

BECAUSE of the coast-to-coast distribution of plants of the steel industry, two out of every five members of Congress represent constituencies in which steel workers live, according to the American Iron and Steel Institute.

Since 29 separate states contain at least one iron or steel manufacturing plant, 58 senators, or 60 per cent of the total number in the Senate, represent iron or steel-producing areas.

In the House, 168 congressmen, or 39 per cent of the total of 435, come from districts in which members of the steel industry have plants.

French Steel Industry Reported Short of Men

WASHINGTON — The French iron and steel industry, operating at capacity and unable to keep up with current orders, is said by the Commerce Department to be suffering from a labor shortage and reduced transportation facilities.

The report noted that all distribution, exportation, and importation of iron are subjected to stringent government control under two committees—one for hematite iron, the other for phosphoric iron. The purchase or sale of iron and steel scrap is in the hands of a government commission and, under a general movement launched by Chambers of Commerce and welfare organizations, scrap iron is being collected at depots established throughout the country.

Cutler-Hammer Sales Up

CUTLER-HAMMER, INC., Milwaukee, has decided to concentrate the manufacture of its multi-breaker unit, designed to replace fuse boxes in homes, in its New York plant in order to relieve congestion in the Milwaukee factory. January sales exceeded December by 20 per cent and those of January a year ago by about 70 per cent. Shipments in January this year were said to be the largest since 1937. February has been off about 10 per cent but is running about 40 per cent ahead of a comparable period a year ago.

LABOR BOARD RULINGS

WASHINGTON — The Labor Board this week:

Certified the Amalgamated Association of Iron, Steel and Tin Workers (SWOC) as sole collective bargaining agency for production and maintenance employees of Florence Pipe Foundry & Machine Co., Florence, N. J., following an election favoring the Amalgamated, 263 to 215.

Ordered an election within 30 days among production and maintenance employees of American Radiator & Standard Sanitary Corp. at Litchfield, Ill. Employees may vote for the Amalgamated Association, the Litchfield Radiator Workers' Association or neither.

Certified the Newark Rivet Works Employees Mutual Association as sole bargaining agent of production, shipping and maintenance employees of Newark Rivet Works, Newark, N. J., after a 227 to 103 vote for the independent union.

Dismissed an investigation and certification petition filed by AFL's International Molders Union following a five-to-nine vote against the AFL affiliate by employees of American Scale Co. and Frank Davenport, Pleasant Hill, Mo.

Fluorescent Lamps Cut 15%

GENERAL ELECTRIC CO.'s lamp department announces an average price reduction of 15 per cent on fluorescent lamps.

Harry Bridges Helps SWOC In Columbia Steel Plant

SAN FRANCISCO—The launching of a drive to "unionize 100 per cent" the 2600 workers in Columbia Steel Co.'s Pittsburg, Cal., plant, is announced by Harry Bridges, Pacific Coast CIO leader. Bridges denounced the activities of those who are willing to aid warring nations but fail to "see the need of our own people here at home," and said: "If we can't get it done by the Government, or by the state, we'll have to eliminate unemployment and want ourselves while the AFL sits on its chair."

New Monthly Publication for New England Foundrymen

THE Mystic Iron Works and New England Coke Co. jointly have inaugurated a monthly magazine for foundrymen of New England. It is called the New England *Iron News*, and is filled with items of interest to foundrymen. A feature of the magazine is the question and answers department, which in the first or January issue contains questions regarding foundry practices by H. A. Jensen, foundry superintendent, General Electric Co., River Works, Lynn, Mass., and LeRoy M. Sherwin, foundry superintendent, Brown & Sharpe Mfg. Co., Providence, R. I., and answers to these questions by James D. Coltman, foundry superintendent, Bullard Co., Bridgeport, Conn., and president of the Connecticut Foundrymen's Association.

Monthly Shipments of Finished Steel Products by United States Steel Corp.—Net Tons

Month	1936 Shipments	1936 Per Cent of Capacity	1937 Shipments	1937 Per Cent of Capacity	1938 Shipments	1938 Per Cent of Capacity	1939 Shipments	1939 Per Cent of Capacity	1940 Shipments	1940 Per Cent of Capacity
January	795,214	44.8	1,268,403	75.4	570,264	33.7	870,866	51.8		
February	747,375	45.3	1,252,845	82.5	522,395	35.5	747,427	49.3	1,145,592	...
March	863,946	50.5	1,563,113	92.7	627.047	37.2	845,108	50.4		
April	1,080,667	63.2	1,485,231	91.0	550,551	33.7	771,752	47.5		
May	1,087,395	63.4	1,443,477	85.5	509,811	30.2	795,689	47.4		
June	978,030	57.1	1,405,078	85.8	524,994	32.1	607,562	49.7		
July	1,050,085	61.3	1,315,353	77.9	484,611	28.8	745,364	44.5		
August	1,019,882	59.6	1,225,907	72.6	615,521	36.3	885,636	52.7		
September	1,060,708	62.0	1,161,113	71.1	635,645	37.5	1,086,683	66.9		
October	1,108,973	62.6	875,972	52.0	730,312	43.1	1,345,855	79.9		
November	974,292	59.2	648,727	39.7	749,328	45.6	1,406,205	86.1		
December	1,178,598	68.8	539,553	32.1	765,868	45.2	1,443,969	85.8		
Yearly adjustment	(—)40,163	...	(—)87,106	...	(+)29,159	...	(—)44,865	...		
Total for year	11,905,002	58.2	14,097,666	70.4	7,315,506	36.7	11,707,251	59.4		

The above table has been revised to conform with the practice of reporting shipments on a net ton basis inaugurated by the corporation in January, 1940. Previously, monthly shipments were reported as "tons," which included both net and gross tons on an unadjusted basis. It is not possible to compute the 1940 percentage figure until the 1940 capacity figure on a net ton basis is available.

A.S.M.E. Plans Spring Meeting At Worcester, Mass., May 1-3

WORCESTER, MASS. — Because of the nature of industries in the Worcester area, many of the 26 papers to be presented before the 1940 spring meeting of the American Society of Mechanical Engineers, to be held in Worcester at the Hotel Bancroft, May 1 to 3, will relate to machine shop practice and iron and steel. The meeting will be under the sponsorship of the society's Worcester section which will also be celebrating its 25th anniversary. The general committee chairman is Prof. Charles M. Allen, Worcester Polytechnic Institute.

In addition to the events listed below, there is scheduled a general luncheon on May 1, an informal reception the same evening and a banquet the evening of May 2.

Wednesday May 1

10 a. m.

Iron and Steel Session

From the Anvil to the Press, John W. Higgins, president, Worcester Pressed Steel Co., Worcester, Mass.

Modern Metal Forming, Harold T. Burke, chief tool designer, Worcester Pressed Steel Co.

8 p. m.

Machine Shop Practice

Deep Drilling, Eric Hirvonen, Leland-Gifford Co., Worcester.

The Use of High-Speed Photography in the Study of Machine Motions, Victor Sepavich, Crompton & Knowles Loom Works, Worcester.

Thursday, May 2

9.30 a. m.

Session on Management and Machine Shop Practice

Personnel Management in the Small Shop, Harold B. Bergen, industrial relations consultant, McKinsey & Co., New York.

Merit Rating of Employees, C. R. Dooley, manager industrial relations, Socony-Vacuum Oil Co., Inc., New York.

Friday, May 3

9.30 a. m.

Materials Handling Session

Modern Developments in Materials Handling, Russell Hastings, chief engineer, Lewis-Shepard Sales Corp., Watertown, Mass.

Handling Finished Machine Tools, by A. L. Wilkinson, Leland-Gifford Co., Worcester.

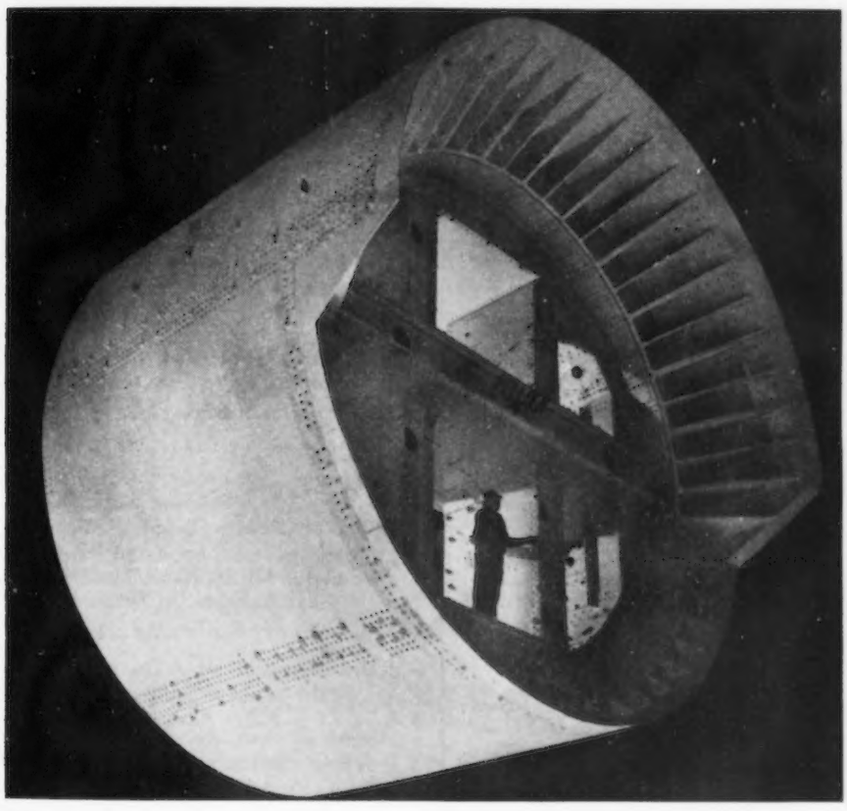
Iron and Steel Session

Factors in the Fatigue of Helical Springs, R. R. Tatnall, Wickwire-Spencer Steel Co., Worcester.

Giant Steel Shields for Chicago Subway

FOUR giant steel shields, each weighing 190 tons, have been supplied for the Loop sections of the new Chicago subway by the William B. Pollock Co., Youngstown engineer, fabricator and erector. They are the first built in several years, and are being used by the Healy Subway Construction Co.

The accompanying photo, showing construction details, which was taken in the Pollock shop from an overhead crane, gives an indication of the size of the shields which are 25 ft. in diameter and 19 ft. long.



The shields cut through the soil like a giant biscuit cutter cutting through dough. The semi-circular hood with the cutting edge juts out 4 ft. in front of the top half of the shield. The hood cuts through the soil as the shield is pushed forward by 24 giant steel jacks having a pushing power of 200 tons each. As the shield moves forward, the steel lining for the tunnel is erected in the tail of the shield. The shield protects the subway workers from soil cave-ins, and safeguards buildings along the street by minimizing settlement.

The total number of shop rivets and bolts used in the four shields was 72,196, with a weight of 58,748 lb.; and the total number of field bolts and rivets was 24,432 with weight of 28,936 lb.

The shields were shipped to Chicago in sections from Youngstown. Two are used on the Dearborn Street section and two on the State Street section. The contract calls for their use in the Loop areas only.

The Pollock company has built a number of such shields for other projects in past years.

. . . THE NEWS IN BRIEF . . .

Detroit purchasing agents are buying well into the future, according to latest data.—**Page 44.**

Automobile production is steadier. Sales and registration data stir optimism over spring demand for cars.—**Page 44.**

Belleville stove plants resume production.—**Page 47.**

Senator Davis promises to fight against any FTC proposal eliminating steel basing points.—**Page 48.**

Likelihood of steel scrap licensing bill's passage considered remote.—**Page 50.**

Iron and steel purchases reported by Division of Public Contracts total $628,681 for week ended Feb. 10.—**Page 52.**

U. S. Steel Export Co. to handle sale of Champion welding electrodes abroad.—**Page 53.**

Navy Department's Bureau of Supplies and Accounts awards more contracts.—**Page 53.**

Frank M. Robbins is awarded Lorenz medal at annual meeting of Steel Founders Society of America.—**Page 54.**

1200 study job problems at 3-day conference of American Management Association.—**Page 55.**

Westinghouse salaries and wages rise to 10 per cent above base rate.—**Page 56.**

Russia is building four new blast furnaces of 1400-ton capacity.—**Page 56.**

Industrial pioneers honored on 150th patent office anniversary.—**Page 57.**

Westinghouse salaried workers choose inside union, voting 2136 to 81.—**Page 58.**

Belgian steel output gained in December.—**Page 58.**

Canadian war orders to be placed soon on a larger scale.—**Page 59.**

Iron ore is believed to be Germany's most serious deficiency.—**Page 60.**

National Tube Co. builds new sintering plant at Lorain, Ohio.—**Page 60.**

George H. Jones, former Inland Steel Co. president, gives $1,660,000 to hospital.—**Page 61.**

Wallace T. Gray is elected chairman, New York-New Jersey chapter, A.S.T.E.—**Page 61.**

Steel companies plan to spend $146,000,000 for new equipment in 1940, according to American Iron and Steel Institute.—**Page 61.**

Two of every five congressmen are from states producing iron and steel products.—**Page 63.**

Scrap consumption in U. S. shade lower in January; foundries take 20 per cent.—**Page 63.**

SECTIONS INDEX

Personals	62
Obituary	63
Steel Ingot Production	73
Summary of the Week	74
Comparison of Prices	75
Markets	76
Fabricated Steel	80
Non-ferrous Market	81
Scrap Market and Prices	82
Finished Iron & Steel	84
Pig Iron & Raw Material Prices	86
Warehouse Prices	87
Machine Tool Activity	89
Plant Expansion & Equipment	90

MEETINGS

Feb. 29 and March 1—American Hot Dip Galvanizers Association annual meeting, Pittsburgh.

March 7 and 8—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Southern Pines, N. C.

March 7 to 9—American Society of Tool Engineers, annual meeting, New York.

March 14 and 15—Society of Automotive Engineers, national aeronautic meeting, Washington.

April 10 to 12—International Acetylene Association, annual convention, Milwaukee.

April 11 and 12—Galvanizers Committee of American Zinc Institute, annual spring meeting, Pittsburgh.

May 6 to 10—American Foundrymen's Association, annual meeting and equipment exhibition, Chicago.

May 20 to 22—American Gear Manufacturers Association, annual meeting, Asheville, N. C.

May 23—American Iron and Steel Institute, annual meeting, New York.

Williams & Kilsby organizes to sell various steel products on West Coast.—**Page 63.**

Bureau of Reclamation awards $1,088,330 generator contract to Westinghouse.—**Page 63.**

Mystic Iron Works and New England Coke Co. inaugurate new monthly magazine for foundrymen.—**Page 64.**

NLRB certifies SWOC at Florence Pipe Foundry & Machine Co. plant, orders election at American Radiator plant.—**Page 64.**

Labor shortage reported in French steel industry; government puts pig iron, scrap under rigid control.—**Page 64.**

Monthly shipments of finished steel products by United States Steel Corp.—**Page 64.**

Cutler-Hammer reports sales increase, concentrates multi-breaker unit in New York plant.—**Page 64.**

General Electric Co. cuts fluorescent lamp price 15 per cent.—**Page 64.**

Harry Bridges helps SWOC in organizing Columbia Steel Co. employees.—**Page 64.**

American Society of Mechanical Engineers plans spring meeting at Worcester, Mass., May 1-3.—**Page 65.**

Eighth annual foundry practice conference sponsored by the Birmingham chapter, A.F.A., to be held Feb. 22-24.—**Page 69.**

Independent Pneumatic Tool Co. tells distributers of new tool by arranging world broadcast.—**Page 70.**

Hydraulic Press Mfg. Co. to construct $500,000 plant near Mount Gilead, Ohio.—**Page 70.**

Committee on Strategic Materials advises Roosevelt: "Buy Now."—**Page 70.**

Sales of industrial gears resumes upward trend in January.—**Page 89.**

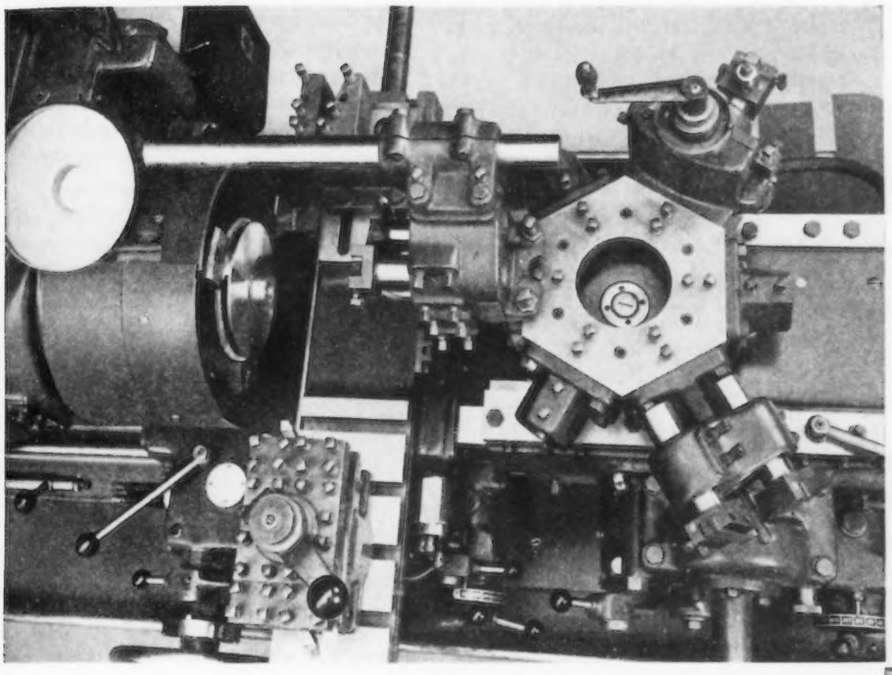
American Institute of Steel Construction awards prizes for best design of steel pedestrian bridge overpassing a vehicular express highway.—**Page 89.**

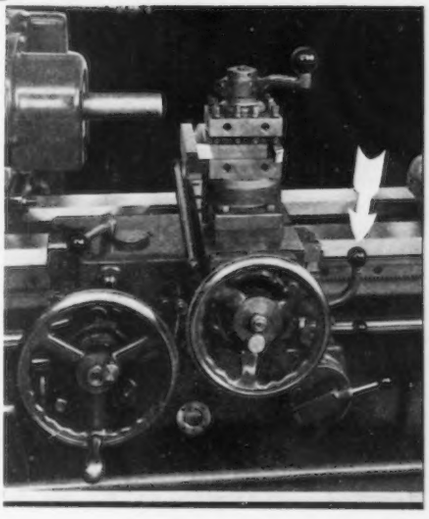
An Investment

Jones & Lamson Universal TURRET LATHES *Will*

PAY CONTINUOUS DIVIDENDS

The problems of tomorrow, as well as those of today, form the basis of sound investment planning. . . . Jones & Lamson Universal Turret Lathes not only meet the requirements of today, but anticipate the tools of tomorrow.





POWER RAPID TRAVERSE FOR THE CARRIAGE CROSS-SLIDE
Fast-cutting hard-alloy tools impose an ever-increasing strain on the Turret Lathe operator. As an example, the flange of this bronze pump impeller — 7″ in diameter — is faced in *less than 5 seconds* and other cuts are taken at similar speeds. Jones & Lamson Universal Turret Lathes are designed to reduce handling time to a minimum — NOW POWER RAPID TRAVERSE for the CARRIAGE CROSS-SLIDE is available for all Jones & Lamson Universal Turret Lathes.

With Single Lever Control and other labor saving devices Jones & Lamson Universal Turret Lathes reduce human fatigue and create a closer relation between cutting time and handling time.

New Catalogues describing the full line of Jones & Lamson Universal Turret Lathes will be mailed upon request.

JONES & LAMSON MACHINE COMPANY

SPRINGFIELD, VERMONT, U. S. A.

MANUFACTURERS OF: SADDLE & RAM TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC DOUBLE-END MILLING & CENTERING MACHINES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . TANGENT AND RADIAL, STATIONARY AND REVOLVING DIES AND CHASERS

Roosevelt Told: Buy Vital Materials Now

WASHINGTON—The War and Navy Department's interdepartmental committee on strategic materials, administering the $100,000,000 strategic and critical material purchasing program, has advised President Roosevelt that now is the time to buy. The committee set forth these points:

1. Commercial stocks in this country of many vital raw materials are now considerably below normal. 2. Prices of the desired items are more favorable. 3. Supply and transportation difficulties and higher prices are likely to be encountered if the war increases in intensity. 4. In the event of unlimited warfare, a reserve of supplies might prove of vital importance in defense and strengthening neutrality. 5. The materials can readily be converted into cash at a profit.

Mr. Roosevelt transmitted the committee's report to Congress last week when he recommended that $15,000,000, the amount suggested in his budget message, be made available immediately. Last year Congress appropriated $10,000,000 but this amount will shortly be exhausted, the President's memorandum said.

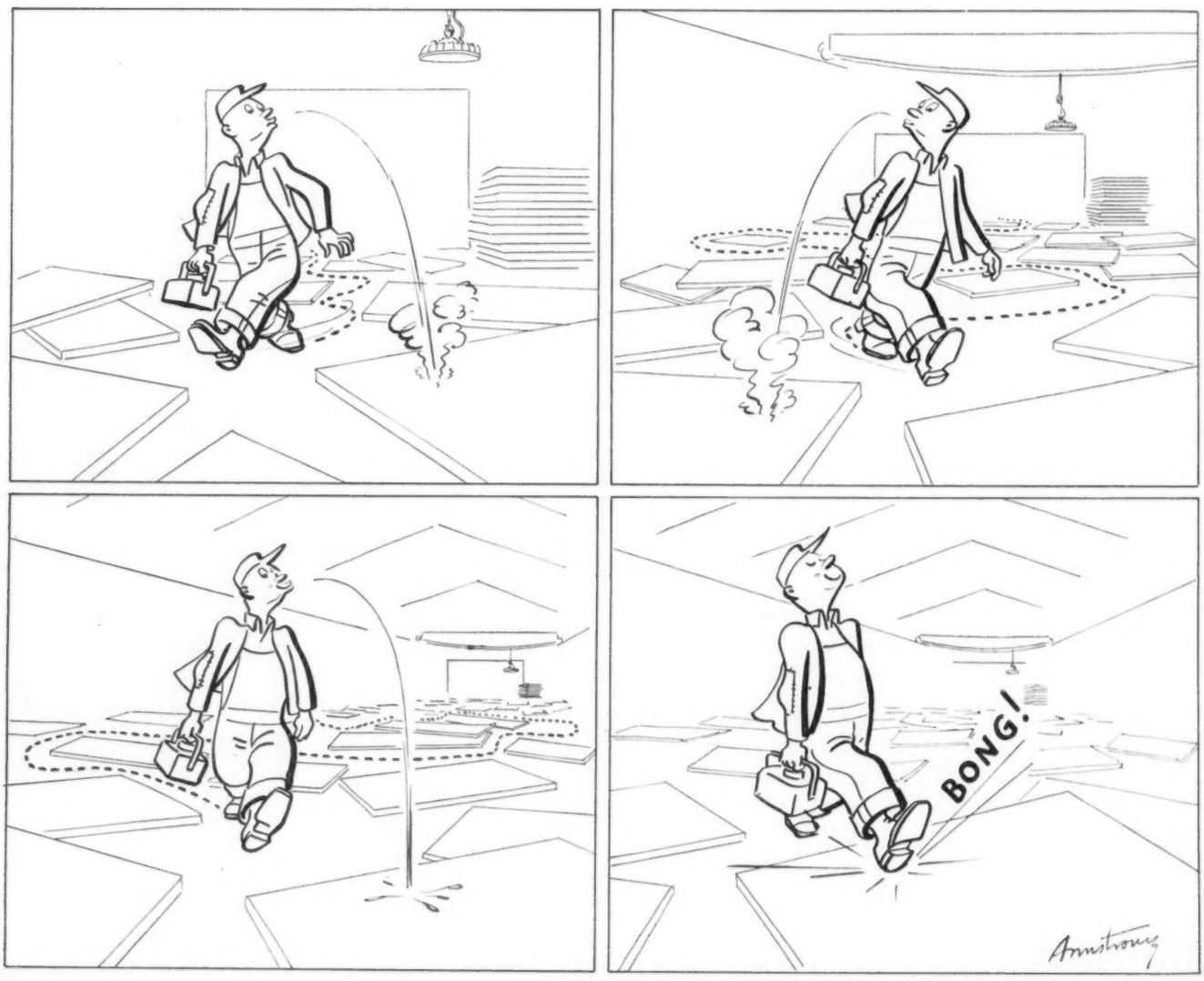
$500,000 Press Plant

CLEVELAND — Plans for construction of a $500,000 plant by the Hydraulic Press Mfg. Co., Mount Gilead, Ohio, have been announced by Howard F. MacMillin, president. Plant will be located in 60 acres half way between Mount Gilead and Edison, about one-half mile west of the present plant. Estimated cost of the plant includes new equipment to manufacture larger presses.

Distributers Hear of New Tool Through World Broadcast

A GLOBE-GIRDLING telephonic broadcast was made by the Independent Pneumatic Tool Co., Chicago, on Feb. 6 to introduce the Thor-Nado, new portable electric hammer, to distributers throughout the world. Utilizing the facilities of the telephone company's conference hook-up, the program originated from an impromptu studio in the Chicago offices of the tool company and was relayed to the various points where distributers and the company's own men were assembled to hear it via public address systems.

The program was prepared by vice-president Neil C. Hurley, Jr., and advertising manager Norman Kirchner, directed by a professional announcer, and enacted by officers and employees at the Chicago office.



Senator Davis Ready to Fight FTC Basing Point Proposals

WASHINGTON — Senator James J. Davis, Republican of Pennsylvania, served notice on the Senate last week that, if the Federal Trade Commission's proposal to abolish the multiple basing point system for an f.o.b. mill pricing substitute reaches the Congress in the form of a bill, he will oppose the measure "with all the logic and persuasion at my command."

Taking his cue from recent hearings before the Temporary National Economic Committee, during which the FTC let forth another blast against the steel industry, the Senator had this to say of the FTC proposal:

"In my judgment the human considerations involved far outweigh the theoretical objections to the multiple-basing point system now in effect. The proposed legislation holds a threat against the jobs, savings, and general welfare of workers in the steel industry at the points where the industry is best established. It holds a threat which has no sufficient justification in terms of public welfare or prospect for improved conditions."

"Theoretical Abstractions" Hit

Characterizing as "neither sound nor logical" the commission's argument that the an f.o.b. mill pricing system should be imposed on the steel industry because the basing point system has "somewhat restricted price competition," Senator Davis charged that, in advocating the destruction of the multiple-basing-point system the FTC advocates "changes in existing conditions of our American life irrespective of what better provision may be made for them." He told the Senate that opponents of the present system base their criticism on "theoretical abstractions which are actually nonexistent," adding:

"They exist only in the minds of critics. They assume large proportions of astronomical value. Practically they are of little worth; and if they were actually to be imposed on the steel industry, they would produce such chaos and confusion as to retard business recovery, accentuate unemployment, and increase the already mounting burdens of grievance, of which labor today is carrying a full pack."

With the explanation that there exists today "a curious and widespread assortment of misinformation and distorted facts concerning the steel industry," the Senator pointed out that the industry with but few exceptions is not excelled from the standpoint of the welfare of the workers by any other large industry in the country; that, with a total investment of $5,000,000,000 divided among a half million stockholders, the industry's net earnings from 1921 to 1932 were 4.3 per cent; that in 1932 there was a loss of 4.3 per cent; that the steel industry is very largely in the leadership of men who have risen from the ranks, that during the last 50 years the trend of steel employment has been strongly upward; and that a recent survey shows that the employees of some 101 companies employing more than 90 per cent of the total number on steel company payrolls are participating in and actively supporting representation plans in effect to the extent of 89 per cent of all workers on payrolls.

Fetter's Conclusions Criticized

With data furnished him by TNEC Chairman Joseph C. O'Mahoney, Senator Davis traced the development of the multiple basing point system from the Pittsburgh plus pricing system and the Federal Trade Commission's complaint against the industry back in 1922 up through the NRA code days to 1938 when additional basing points were established by the industry. He reminded the Senate that Dr. Melvin G. de Chazeau, co-author of the book "The Economics of the Iron and Steel Industry," and Justice Department economic adviser on the steel industry, does not support the FTC view favoring the establishment of an f.o.b. mill pricing system.

The Senator also criticized the viewpoint of Dr. Frank Fetter, professor of economics at Princeton University who has supported the FTC proposal on numerous occasions and who is recognized as an outstanding critic of the basing point system.

"In his book entitled 'The Masquerade of Monopoly,' Professor Fetter shows the discrimination inherent in a basing point system of delivered prices, but his analysis of the evolution of this pricing system is couched entirely in terms of conspiracy and collusion," Senator Davis said. "Nowhere in his book is there the faintest recognition that the economic conditions of production and distribution may have become fundamentally inconsistent with the existence of perfect competition.

"Professor Fetter never raises the question, What method of pricing can be made to work in the steel industry? His defense of the mill base price rests not on an analysis of the steel industry, but on a deduction from the concept of a free market under perfect competition."

Southern Foundrymen Will Meet Feb. 22 to 24

THE eight annual foundry practice conference sponsored by the Birmingham chapter of the American Foundrymen's Association, to be held Feb. 22 to 24, will feature addresses on merchandising castings, foundry safety, off grade cast iron, personnel relations and the influence of sand on the physical and mechanical properties of castings. Several local plant visitations have also been planned.

Among the papers scheduled for presentation at the meeting are "How Do You Sell Your Castings" by W. W. Rose, Gray Iron Founders' Society; "The Value of the American Foundrymen's Association to the Foundry Industry," by L. N. Shannon, Stockham Pipe Fitting Co. and national vice-president of the association; "Safety in the Foundry," by Warren Whitney, National Cast Iron Pipe Co.; "Off Grade Cast Iron," by V. A. Crosby, Climax Molybdenum Co.; "Foundry Personnel Problems," by H. J. Noble, American Cast Iron Pipe Co., and "How Does Sand Affect the Physical and Mechanical Properties of Castings?" by H. W. Dietert, H. W. Dietert Co.

The annual banquet will be held Thursday evening with Frank M. Dixon, governor of Alabama, the guest speaker. All technical sessions will be held at the Tutwiler Hotel.

New Scrap Yard

CINCINNATI—The David J. Joseph Co., scrap dealer, will open a specialty scrap yard at Fifth and Baymiller Streets to handle specialties for foundries, and electric furnaces. It will also sell used structural steel. Delmer C. Lee, who has been with the company for several years, will be in charge.

ICC Approved Midwest Trucking Rate Cuts on Steel Products

WASHINGTON—Reduced motor truck rates, minimum 20,000-lb. on iron and steel products were approved last week by the Interstate Commerce Commission. The motor carriers were represented by the Central States Motor Freight Bureau, Inc., having 700 members. The commission sanctioned reductions ranging from 1½c. to 3c. per 100-lb. on manufactured steel products from Detroit to points in Ohio and Pennsylvania. It also approved reductions ranging from 1c. to 6c. on steel products from and to points in Illinois, Indiana, Iowa and Pennsylvania.

Representative examples of the new and former rates from Detroit, in cents per 100-lb. follow:

From Detroit to	New Rates	Former Rates
Cincinnati (1)	21.5	24.5
Cleveland (1)	15	17(2)
Elyria, Ohio	15	16.5
Fostoria, Ohio	13	15
Norwalk, Ohio	15	17.5
Salem, Ohio	18.5	21
Toledo	8	10.5
Farrell, Pa.	23	26
Pittsburgh (1)	26.5	29
Sharon, Pa.	23	26

(1) Except on cast iron pipe and cast iron pipe fittings. The new rates on these commodities are 2c. higher to Cleveland, Elyria, and Toledo, and 1c. higher to Fostoria and Norwalk than those shown in the table.

(2) Bands, bars, billets, blanks, blooms, plates, rails, sheets, sheet bars, skelp, strips, and structural steel; 20c. on other articles included in the iron and steel list.

The new rates from and to Illinois, Indiana, Iowa and Pennsylvania follow: From Rock Island, Ill., to Ft. Wayne, Ind., from Ft. Wayne to East Moline and Rock Island, Ill., and from Indianapolis, to East Moline and Rock Island, and Davenport, Iowa, 28c.; and from Erie, Pa., to Chicago, 40c. The former rates from and to all of these points were 29c., except that the rates from Indianapolis to Davenport and from Erie to Chicago were 34c. and 42c., respectively. The present rail rates are 29c., except that the rate from Erie to Chicago is 36c. The rail rates are subject to a carload minimum of 40,000 lb.

The commission has suspended until May 19 motor schedules filed by A. Duie Pyle, Coatesville, Pa., proposing a reduction in rates on iron and steel products from Phoenixville, Pa. The rates to Baltimore and Washington would be cut 1c. per 100-lb. to 24c. and 26c., respectively, the minima charges remaining at $15 and $25. The products affected are plates, sheets, washers, boiler heads and tubes, welding iron and steel, structural sheel and steel tanks.

The commission also has authorized a reduction to $2.69 per ton on coke from the present rate of $3.03 from Birmingham, Ala., and points taking the same rate to Albany, Ga., by a group of rail carriers. The cut was allowed by waiving the long-and-short-haul clause in order to meet the direct route rate of $2.69 maintained by the Central of Georgia.

New Cast Iron Pipe Plant in West To Utilize Bonneville Dam Power

WASHINGTON — The Sierra Iron Co. of Nevada has signed a 20-year contract with the Federal government for power from the Bonneville Dam and will build electric furnaces and a cast iron pipe plant at Vancouver, Wash., it was announced Tuesday by Secretary of the Interior Harold L. Ickes.

Signing of the contract was reported by Administrator Paul J. Raver of the Bonneville project. It was stated that the agreement provides for delivery of successive blocks of Bonneville power up to 6000 kw. during the year and contemplates additional deliveries up to a total of 30,000 kw. within two years.

It was said that the capacity of the furnaces on the basis of 30,000 kw. will be 500 tons of iron per day. Construction of the plant, the announcement said, will start immediately and the first unit is to begin production by May 1. The plant will be about 60 miles from the dam.

Hailing the contract as another step in the Administration program to establish metal-working industries in the Pacific Northwest by use of Bonneville electric power, Secretary Ickes pointed out that it followed by a few weeks the execution of a contract with the Aluminum Co. of America for 32,000 kw. of Bonneville power to serve a plant, also near Vancouver, for the manufacture of aluminum.

The Sierra plant, Secretary Ickes said, will be erected under the supervision of the company's president, D. F. Hawkins. Albert E. Greene, treasurer, will be in charge of electric furnace installation, explanation having been made that the process involves electric smelting of ore to be obtained from deposits in the vicinity of Scappoose, Ore. Coal will come from the Chehalis, Wash., fields and limestone from the Pacific Northwest.

U. S. Steel's $30,000,000 Project In Brazil "Off Indefinitely"

THE plan involving construction of a steel plant in Brazil by United States Steel Corp. is "off indefinitely," THE IRON AGE learned this week. No details were available at midweek from the company or from others interested. Several months ago the Brazilian government publicized a plan by which U. S. Steel, with the help of that government, was to establish a $30,000,000 steel plant in Brazil, utilizing iron ore from the state of Minas Geraes. Transportation difficulties and lack of coal have for several decades been among the obstacles to exploitation of Brazil's iron mines.

* * *

Washington—The Brazilian embassy here declined to comment on current reports of abandonment of plans of the Brazilian government and the United States Steel Corp. to build a $30,000,000 steel plant in Brazil. Government officials also were non-committal except that President Pierson of the Export-Import Bank said that the Brazilian government had made no application to the bank for a loan. In other quarters it was reported that the Steel corporation decided to withdraw from the plan and that the Brazilian government now is trying to interest other American steel companies in the project.

Steel Warehousing Facilities Being Expanded

ONE of the significant developments of recent months is the expansion that has been taking place in facilities for the warehousing of steel throughout the country. A number of new or enlarged steel warehouses have been added. Two of the more recent are the new warehouse of the Bethlehem Steel Co. at Houston, Tex., and the enlarged warehouse of Joseph T. Ryerson & Son, Inc., in Philadelphia.

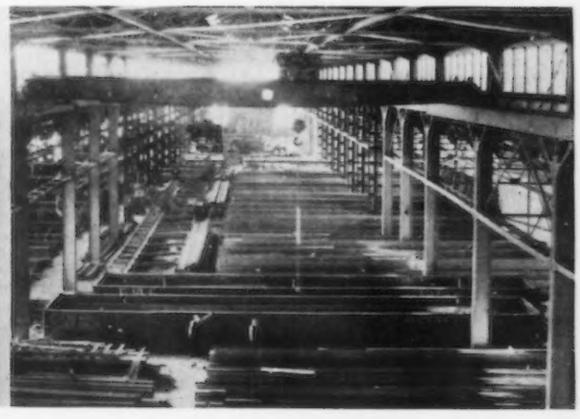
The new Bethlehem warehouse is one of the largest of its kind in the South, occupying two acres of floor space. One of its features is a ramp truck driveway, which continues through the building, connecting at the rear with a driveway; tracks run through the building for incoming and outgoing materials. The new warehouse was constructed to take care of an increased demand for galvanized and hot rolled sheets, wire products, rope and strand. An adjoining office building provides accommodations for the sales forces of the Bethlehem Steel Co. and the Bethlehem International Supply Co.

A reconstruction and expansion program recently completed at the Ryerson plant in Philadelphia has increased floor space by 250,000 sq. ft. and more than 1750 new items have been added to the stock. A new high-bay type mill building, 120 x 185 ft., was erected for storing structural lines, such as beams, angles, channels, etc. Railroad spur tracks running into the new span permit the handling of all incoming and outgoing shipments without exposure of stock to the weather. Another building gives 20,000 sq. ft. for the storing of cold finished bars, full finished sheets, mechanical tubing and other high quality steels. Evenly controlled temperatures protects the finish of these products.

Layout and storage facilities of the plant have been rearranged to handle expeditiously the more than 5000 items now carried in stock. New type hand trucks have been installed for more rapid transfer of stock, shipping floor area has been increased and shipping platforms revamped for faster handling. New equipment has been installed to speed cutting operations.

o o o

UPPER illustration is of the new Bethlehem Steel Co. warehouse in Houston, Tex., and the lower one shows the expansion that has taken place in the warehouse of Joseph T. Ryerson & Son, Inc., in Philadelphia.



Current Metal Working Activity

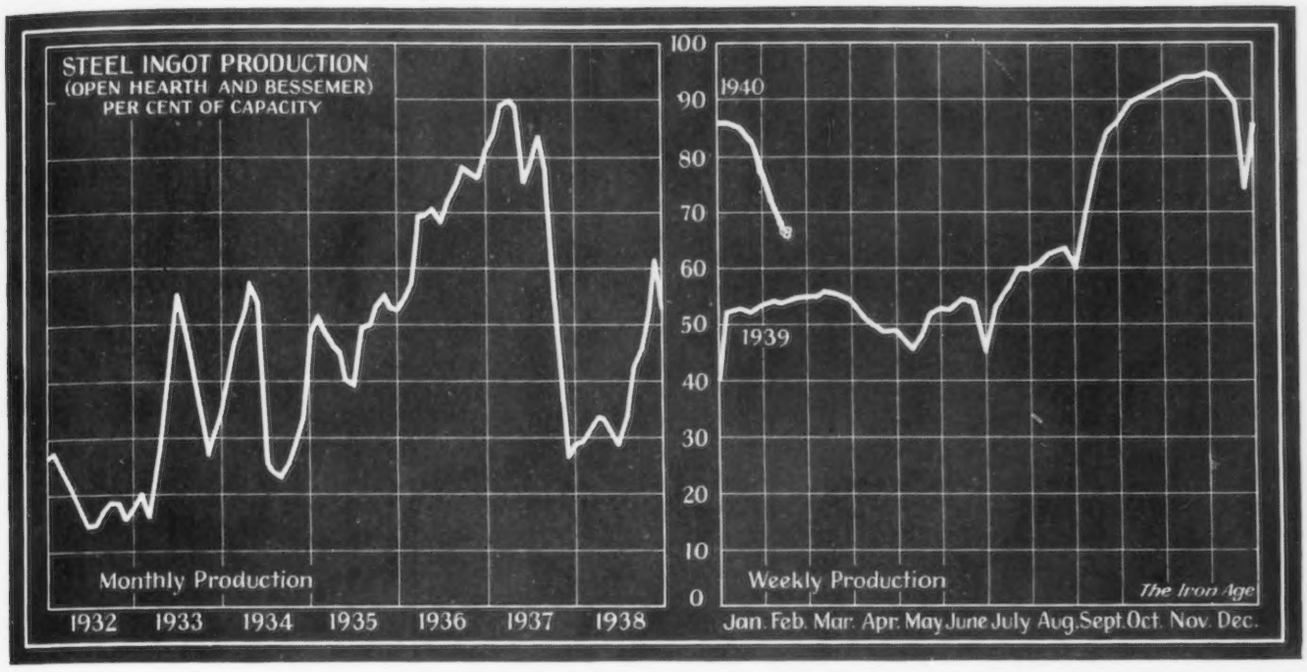
Latest Data Assembled by THE IRON AGE from Recognized Sources

	January 1940	December 1939	November 1939	December 1938	12 Months 1939	12 Months 1938
Steel Ingots: (gross tons)						
Monthly output[a]	5,017,588	5,164,420	5,462,616	3,130,746	45,768,899	27,742,225
Average weekly output[a]	1,132,638	1,168,421	1,273,337	708,314	877,808	532,072
Per cent of capacity[a]	83.18	85.57	93.26	52.79	64.29	39.65
Pig Iron: (gross tons)						
Monthly output[b]	3,600,020	3,768,336	3,720,436	2,210,728	31,533,370	18,782,236
Raw Materials: (net tons)						
Coke output[c]		5,031,797	4,912,773	3,438,445	44,425,123	32,495,800
Lake ore consumed[d] (gross tons)		5,538,374	5,477,969	3,040,700	44,361,289	25,703,050
Scrap iron and steel consumed[r]	3,775,000	3,805,000	4,025,000	2,411,977	35,006,000	21,528,000
Castings: (net tons)						
Malleable, orders[e]		45,978	51,778	35,633	489,482	289,384
Steel, orders[e]		64,143	99,899	38,342	685,074	333,278
Finished Steel: (net tons)						
Trackwork shipments[a]		7,355	6,640	2,840	69,250	37,336
Fabricated shape orders[f]		84,383	99,316	163,445	1,305,049	1,256,639
Fabricated plate orders[e]		23,627	26,020	28,218	357,393	285,061
U. S. Steel Corp. shipments[g]	1,145,592	1,443,969	1,406,205	765,868	11,707,251	7,315,506
Fabricated Products:						
Automobile production[h]		462,500††	350,000††	388,346	3,725,000††	2,655,171
Steel furniture shipments[e]		$2,159,729	$2,142,154	$1,982,023	$22,609,168	$20,355,973
Steel boiler orders[e] (sq. ft.)		553,796	802,033	891,926	11,098,316	4,199,442
Locomotives ordered[i]	28	127**	41	28**	415	228
Freight cars ordered[i]	209	4,381**	7,691	2,674**	56,915	16,539
Machine tool index[j]	93.3	93.3	91.2	*	70.0	*
Foundry equipment index[k]		164.8	192.2	141.8	196.5†	106.5†
Non-Ferrous Metals: (net tons, U. S. only)						
Lead shipments[l]		44,881	64,365	33,908	555,074	421,625
Lead stocks[l]		58,777	58,061	115,902	.....	.....
Zinc shipments[m]	57,551	53,468	64,407	39,354	598,972	395,554
Zinc stocks[m]	65,602	65,995	61,522	126,769	.....	.....
Tin deliveries[n] (gross tons)	9,780	11,366	7,870	3,400	71,896	50,660
Refined copper deliveries[o]	108,465	107,380‡	*	47,804	948,559	607,672
Refined copper stocks[o]	135,441	159,485	*	289,755	*	*
Exports: (gross tons)						
Total iron and steel[p]		600,437	605,555	490,095	6,076,429	5,148,006
All rolled and finished steel[p]		280,992	208,233	123,006	1,883,506	1,392,703
Semi-finished steel[p]		78,636	74,868	18,141	328,893	249,635
Scrap[p]		204,298	271,293	321,261	3,551,589	2,974,375
Imports: (gross tons)						
Total iron and steel[p]		14,709	15,216	28,767	315,161	264,550
Pig iron[p]		1,318	2,774	1,237	38,592	33,088
All rolled and finished steel[p]		3,346	4,398	12,744	156,707	155,535

††Three months' average. *Not available. ††Preliminary. **Includes yearly adjustments. ‡Five-months' average.

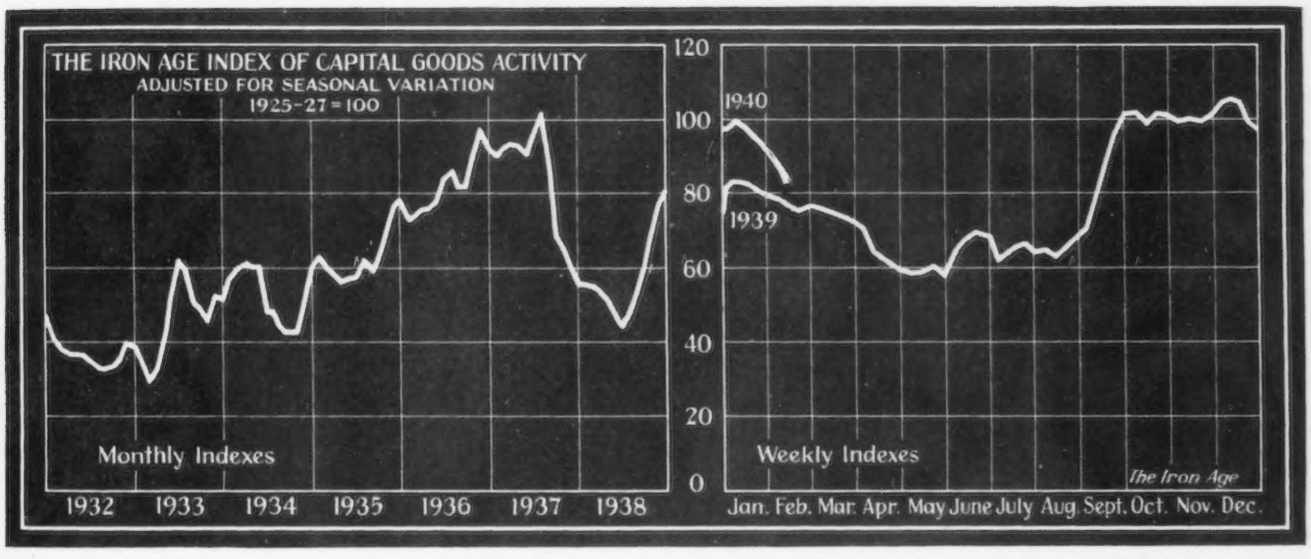
Source of data: [a] American Iron and Steel Institute; [b] THE IRON AGE; [c] Bureau of Mines; [d] Lake Superior Iron Ore Association; [e] Bureau of the Census; [f] American Institute of Steel Construction; [g] United States Steel Corp.; [h] Preliminary figures from Ward's Automotive Reports—Final figures from Bureau of the Census, U. S. and Canada; [i] *Railway Age*; [k] Foundry Equipment Manufacturers Association; [l] American Bureau of Metal Statistics; [m] American Zinc Institute; [n] New York Commodity Exchange; [o] Copper Institute; [p] Department of Commerce; [q] British Iron and Steel Federation; [r] Institute of Scrap Iron and Steel.

Ingot Rate Drop One and One-Half Points to 67% of Capacity



District Ingot Production, Per Cent of Capacity	Pitts-burgh	Chicago	Valleys	Phila-delphia	Cleve-land	Buffalo	Wheel-ing	Detroit	Southern	S. Ohio River	Western	St. Louis	East-ern	Aggre-gate
CURRENT WEEK..	64.0	63.5	45.0	69.0	66.0	72.0	88.0	90.0	88.0	61.5	80.0	61.5	70.0	**67.0**
PREVIOUS WEEK..	66.0	69.0	46.0	76.0	66.0	72.0	80.0	92.0	88.0	61.5	80.0	64.0	70.0	**68.5**

Index at Lowest Point in Five Months



WEAKNESS in all five components pushed THE IRON AGE index of capital goods activity down 4.3 points in the past week to 82.4, the lowest point reached by the index in five months. While in several factors the influence of the holiday was apparent and contributed to the week's loss, the basic causes for the decline lie in the failure of productive activities to improve along seasonal lines. In the automobile series, for example, physical output was practically unchanged from the preceding week, whereas according to seasonal experience there should have been a small increase. It is important to bear in mind, when making comparisons with past years, that the index is adjusted for seasonal variation. Were it not for these adjustments, which are necessary if a true comparison is to be made of various periods of a given year, as well as between periods of different years, the comparison of current indexes with those of a year ago would be more favorable. For instance, on a seasonally adjusted basis, the past week's heavy construction index number represents a decline of 37 per cent from a year ago, while on an unadjusted basis, the loss is less than 25 per cent.

	Week Ended Feb. 17	Week Ended Feb. 10	Comparable Week 1939	Comparable Week 1929
Steel ingot production[1]	91.0	96.0	77.7	117.4
Automobile production[2]	100.5	101.8	84.4	129.3
Construction contracts[3]	65.6	71.0	104.3	132.9
Forest products carloadings[4].	55.6	61.7	44.8	108.1
Production and shipments, Pittsburgh District[5]	99.2	102.9*	72.3	117.2
Combined index	**82.4**	**86.7**	**76.7**	**121.0**

*Revised.

Sources: [1] THE IRON AGE; [2] Ward's Automotive Reports; [3] *Engineering News-Record*; [4] Association of American Railroads; [5] University of Pittsburgh. The indexes of forest products carloadings and activity in the Pittsburgh area reflect conditions as of the week ending Feb. 10. Other indexes cover the week of Feb. 17.

. . . SUMMARY OF THE WEEK . . .

. . . Ingot production declining at a slower rate; at 67 per cent this week.

° ° °

. . . Current orders mostly fill-in lots and individually small.

° ° °

. . . Trend of scrap prices still downward; composite declines 29c. to $16.71.

ALTHOUGH steel ingot production continues to decline, the drops are becoming less precipitous, indicating, perhaps, that a leveling off process may come within the next few weeks. This week's decline is only one and a half points to 67 per cent, which is a few points above the rate of operations that prevailed in August last just before the outbreak of the European war.

In some districts, notably Cleveland, Buffalo, Birmingham and Southern Ohio, there has been no further decline this week, but operations are lower in the Pittsburgh, Chicago, Youngstown, Eastern Pennsylvania, St. Louis and Detroit districts.

There have been relatively few outright cancellations of tonnage on mill books, but deferred shipments have been requested in quite a number of instances. Meanwhile, new business is not showing gains. At best the aggregate volume of incoming tonnage represents 40 to 50 per cent of capacity, while in some instances it is not that good.

Most of the current orders are fill-in lots which are individually small. With prices stable and deliveries from the mills fairly prompt, steel users see no occasion to pursue other than a hand-to-mouth buying policy.

THE hopes of the steel industry for a reversal of the downward trend are based primarily on preparations for the outdoor activity of spring and on export trade. Foreign orders have been in good volume and will, it is expected, be greatly stimulated if the war in Europe assumes a more active phase, but buying for spring activities, which usually manifests itself by this month, has not appeared in noticeable volume, having been delayed by unfavorable weather in some areas.

A possible harbinger of spring is a better showing in fabricated structural steel. Awards of 21,700 tons and inquiries for 34,700 tons are above the average of recent weeks. While public work still accounts for a good deal of the tonnage, private projects that have been awarded include 1200 tons for a rear axle plant for the Buick Motor Car Co., and 2800 tons for a building for the Bell Telephone Laboratories. Among the inquiries of size are 13,000 tons for an elevated highway in Queens, New York, and 10,000 tons for Long Island Railroad grade crossing elimination work.

While the railroads are reported to be considering purchases of freight cars totaling 50,000 to 60,000, it is not believed that action will be taken until deliveries are completed against contracts placed last fall, and this may not come until the middle of the year or later. Current orders are relatively small, as, for example, 60 cars ordered by the Nickel Plate and four locomotives ordered by the Northern Pacific. Steel mills will have shipped most of the steel for current car-building programs by April at the latest.

Automobile assemblies continue at a high rate for winter. Favorable sales figures and the fact that spring is just around the corner encourage the belief that there will be no sharp falling off notwithstanding the large stocks of finished cars that have been built up.

Can manufacture, although coming into its most active season, is drawing partly on stocks of tin plate; consequently tin plate production has declined to 67 per cent, exactly equal to the ingot rate.

The rush to turn out airplanes has brought further large buying of machine tools. Purchases of one type of equipment alone total about $500,000 and may reach $1,000,000.

WITH the exception of reinforcing bars, on which price concessions have been generally recognized, the price situation presents no marked elements of weakness. Steel companies point to increased costs over the past year, caused mainly by additional taxation and wage and hour legislation, as arguments against lower quotations. A change in method of quoting prices has been made by wire producers, who have placed barbed wire and twisted barbless wire on a zone basis similar to that used in quoting fence.

THE trend of scrap prices is still downward. Revisions at Pittsburgh, Chicago and Philadelphia have brought a decline of 29c. in THE IRON AGE scrap composite price to $16.71, or approximately the level of Sept. 12, 1939, which was the first week of the sharp rise that followed the outbreak of war.

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

Per Gross Ton:	Feb. 20, 1940	Feb. 13, 1940	Jan. 23, 1940	Feb. 21, 1939
Rails, heavy, at mill	$40.00	$40.00	$40.00	$40.00
Light rails: Pittsburgh, Chicago, Birmingham	40.00	40.00	40.00	40.00
Rerolling billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point.	34.00	34.00	34.00	34.00
Sheet bars: Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point	34.00	34.00	34.00	34.00
Slabs: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point	34.00	34.00	34.00	34.00
Forging billets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham	40.00	40.00	40.00	40.00
Wire rods: Nos. 5 to 9/32 in., Pittsburgh, Chicago, Cleveland, cents per lb.	2.00	2.00	2.00	1.92
Skelp, grvd. steel: Pittsburgh, Chicago, Youngstown, Coatesville, Sparrows Point, cents per lb.	1.90	1.90	1.90	1.90

Finished Steel

Cents Per Lb.:				
Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15	2.15	2.15	2.25
Plates: Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont	2.10	2.10	2.10	2.10
Structural shapes: Pittsburgh, Chicago, Gary, Buffalo, Bethlehem, Birmingham	2.10	2.10	2.10	2.10
Alloy bars: Pittsburgh, Buffalo, Bethlehem, Massillon or Canton	2.70	2.70	2.70	2.80
Cold finished bars: Pittsburgh, Buffalo, Cleveland, Chicago, Gary	2.65	2.65	2.65	2.70
Hot rolled strip: Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown, Birmingham	2.10	2.10	2.10	2.15
Cold rolled strip: Pittsburgh, Cleveland, Youngstown	2.80	2.80	2.80	2.95
Sheets, galv., No. 24: Pittsburgh, Gary, Sparrows Point, Buffalo, Middletown, Youngstown, Birmingham.	3.50	3.50	3.50	3.50
Hot rolled sheets: Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown	2.10	2.10	2.10	2.15
Cold rolled sheets: Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown	3.05	3.05	3.05	3.20
Wire nails: Pittsburgh, Chicago, Cleveland, Birmingham	2.55	2.55	2.55	2.45
Plain wire: Pittsburgh, Chicago, Cleveland, Birmingham	2.60	2.60	2.60	2.60
Tin plate, 100 lb. base box: Pittsburgh and Gary	$5.00	$5.00	$5.00	$5.00

Pig Iron

Per Gross Ton:				
No. 2 fdy., Philadelphia	$24.84	$24.84	$24.84	$22.84
No. 2, Valley furnace	23.00	23.00	23.00	21.00
No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
No. 2, Birmingham	19.38	19.38	19.38	17.38
No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Basic, del'd eastern Pa.	24.34	24.34	24.34	22.34
Basic, Valley furnace	22.50	22.50	22.50	20.50
Malleable, Chicago†	23.00	23.00	23.00	21.00
Malleable, Valley	23.00	23.00	23.00	21.00
L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Ferromanganese, seab'd carlots	100.00	100.00	100.00	80.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.

Scrap

Per Gross Ton:				
Heavy melting steel, P'gh	*$17.25*	$17.75	$18.50	$15.75
Heavy melting steel, Phila	*17.25*	17.50	17.75	15.25
Heavy melting steel, Ch'go	*15.625*	15.75	16.375	14.25
Carwheels, Chicago	17.25	17.25	16.75	12.50
Carwheels, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Pittsburgh	18.25	18.25	18.75	15.50
No. 1 cast, Philadelphia	20.25	20.25	20.25	16.75
No. 1 cast, Ch'go (net ton)	**14.25**	14.00	14.25	12.75

Coke, Connellsville

Per Net Ton at Oven:				
Furnace coke, prompt	$4.00	$4.00	$4.00	$3.75
Foundry coke, prompt	5.25	5.25	5.50	4.75

Non-Ferrous Metals

Cents per Lb. to Large Buyers:				
Copper, Electrolytic, Conn.	**11.50**	11.25	12.00	11.25
Copper, Lake, New York	**11.50**	11.25	12.00	11.375
Tin (Straits), New York	46.00	46.00	45.00	45.40
Zinc, East St. Louis	5.50	5.50	5.50	4.50
Zinc, New York	5.89	5.89	5.89	4.89
Lead, St. Louis	5.00	5.00	5.35	4.60
Lead, New York	4.85	4.85	5.50	4.75
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

	Finished Steel	Pig Iron	Steel Scrap
Feb. 20, 1940	2.261c. a Lb.	$22.61 a Gross Ton	$16.71 a Gross Ton
One week ago	2.261	22.61	17.00
One month ago	2.261	22.61	17.54
One year ago	2.286	20.61	15.08

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.

Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1940					$17.67, Jan. 2	$16.71, Feb. 20
1939	2.286c., Jan. 3	2.236c., May 16	$22.61, Sept. 19	$20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.512c., May 17	2.211c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.512c., Mar. 9	2.249c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10
1936	2.249c., Dec. 28	2.016c., Mar. 10	19.73, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.062c., Oct. 1	2.056c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.118c., Apr. 24	1.945c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.953c., Oct. 3	1.792c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.915c., Sept. 6	1.870c., Mar. 15	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.981c., Jan. 13	1.883c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.192c., Jan. 7	1.962c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.236c., May 28	2.192c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

. . . THIS WEEK'S MARKET NEWS . . .

STEEL OPERATIONS

. . . Rate for industry declines one and half points to 67 per cent

INGOT production this week is estimated by THE IRON AGE at 67 per cent, down a point and a half from last week. A gain occurred in the WHEELING-WEIRTON district, where a bessemer converter was put in service, bringing that rate up to 88 per cent, but there were losses in the PITTSBURGH, CHICAGO, YOUNGSTOWN, EASTERN PENNSYLVANIA, DETROIT and ST. LOUIS districts, while operations are unchanged in the CLEVELAND-LORAIN, BUFFALO, BIRMINGHAM, SOUTHERN OHIO and WESTERN districts.

NEW BUSINESS

. . . No improvement in incoming orders . . . March gain expected

AGGREGATE specifications last week at PITTSBURGH did not improve from the volume booked in the week before but the leveling out process has caused additional steel producers to look for improvement by mid-March at the latest. Fresh orders are small, both in number and tonnage involved. No one product at the present time is outstanding as fill-in business is fairly uniform. Backlogs are being considerably reduced. Total orders so far this month are not as heavy as in the same number of days in January. New business is still equivalent to about 40 per cent of ingot capacity.

New orders are being received by CHICAGO district mills at a rate which varies between 30 and 40 per cent of shipments. Backlogs are being worked down rapidly in all products. One large mill is now offering any type of sheet in four to five weeks at most, while other products can be shipped promptly.

The possibility of additional automobile and railroad buying is about the only definite expectation of new business CHICAGO sellers have at this time. Railroad inquiries for more cars and rails are sure to develop, it is believed, but just when is uncertain.

Production of implements at farm equipment plants is slowly tapering off, as their stock of finished goods approaches the point indicated by advance dealer orders. Tractor plants generally continue busy. Steel buying from the argricultural machinery industry as a whole today is less than many had expected it to be. One large implement maker is increasing its combine program by 3000 units, and because of higher farm income some observers believe total sales of implements and farm tractors will rise 20 to 25 per cent over a year ago. Orders from general manufacturing plants are not satisfactory.

New business in the CLEVELAND and YOUNGSTOWN districts remains at about the same stage as in other recent weeks, although a few individual items such as electric furnace steel and electrical sheets remain active. Operations of steel consumers are estimated roughly by one steel company, after a survey, at around 5 points above the national ingot rate, but down 5 to 10 points from early December.

Comparisons of 1939 costs with previous years by several manufacturers show that additional taxation and wages and hours legislation outbalance improved methods and machinery. In some cases basic costs have increased 12½ per cent or more. The abnormal fourth quarter brought costs up very sharply. Necessity of maintaining price levels, which are in many industries below 1937, and for confining volume of new business into brackets of the greatest profit, are stressed by these manufacturers, who at the same time hesitate to attempt very steep price advances at this time.

Sales in the ST. LOUIS area continue to lag, with no indications of a pickup for the next two or three weeks. Inventories are in good shape, and users see no advantage in additional commitments, now that prices are stable and deliveries prompt.

In the EASTERN PENNSYLVANIA district incoming business averages between 40 and 45 per cent of capacity. Clarification of prices resulting from the Ford purchase has resulted in the release of several small lots of hot rolled sheets and galvanized stock. Aside from about 10,000 tons of ship plates, little new business of size is in the offing.

Little new business is visible on the PACIFIC COAST. The preponderance of pending projects is private rather than public works, however.

PRICES

. . . Quotations are generally firm except on reinforcing bars

IN spite of considerable pressure from a few buyers, base prices of steel are generally firm. All companies are feeling the pinch of higher costs.

Sheet sellers do not seem surprised that the Ford purchase failed to alter the price structure and considerable confidence is being expressed in the ability of this structure to stand.

Weakness in reinforcing bars is being more generally recognized (see Reinforcing Bar market report).

PIG IRON

. . . Domestic trade dull, sellers await export rise

SHIPMENTS in most areas declined the past week, partly because of the weather and partly due to a lower melt at foundries in the EASTERN territory and elsewhere. With domestic business continuing light, interest is centering on Europe, and some sellers are forecasting a strong export market for pig iron in from 60 to 90 days.

Within the past month there has been a net loss of six blast furnaces in the PITTSBURGH district, 36 of 50 stacks now being in operation. Pittsburgh Crucible Steel Co. has banked one of two Midland, Pa., stacks. Several more weeks of reduced buying are expected by sellers at CLEVELAND, where consumption still is running above production, measured by foundry coke shipments. Carnegie-Illinois Steel Corp. has blown out two more blast furnaces at Gary and has banked a stack at the South Works, the CHICAGO district total declining to 23 of 38. Supplies in consumers' yards at CHICAGO are declining

A moderate expansion in the melt of stove and agricultural implement foundries is reported in SOUTHERN OHIO where machine tool foundries continue most active. The smaller blast furnace of the Hamilton Coke & Iron Division, American Rolling Mill Co., is now producing foundry iron. At CINCINNATI some small contracting is reported as melters make commitments upon expiration of old contracts.

Jobbing foundries are less active in the NEW YORK area. Inquiries for export have increased in number, but buyers so far are interested only in small lots. At PHILADELPHIA new business is running light, although shipments into consumption are expanding. There are several lots of more than 1000 tons before the market for export. One inquiry, calling for several thousand tons of bessemer iron, represents an effort at cooperative buying by a group of Swedish foundries.

NEW ENGLAND foundries are recovering from shipping difficulties caused by snow and the melt may be back to 70-75 per cent next week. For a time pig iron deliveries were virtually stopped because of inability of railroads to move cars. Small orders are reported being placed. A slight pickup in the melt by gray iron foundries is reported at ST. LOUIS, although the market generally is weaker there.

. . . PLATES . . .

. . . Reduction in railroad backlogs leaves little tonnage available for rolling

PLATE demand at PITTSBURGH is no stronger than a week ago and the paring down of backlogs continues. With railroad car programs being rapidly completed, steel producers are disappointed at the non-appearance of new freight car inquiries.

Both universal mill and sheared plates are available from some CHICAGO mills in 10 days to two weeks. Except for an occasional tank order or some structural fabrication, plate demand would be nil. Sellers are looking forward to renewed railroad interest in rolling stock as the most likely market to develop in the near future.

Production is still fair on light plates at CLEVELAND. Repair of Great Lakes vessels, some railroad work and boiler jobs constitute the bulk of new business. In addition to the 800-ton pipe line up for bids soon, the city of Toledo will take bids March 6 on an elevated water tank requiring 500 tons.

Interest in the East is centered on export demand. Moderate tonnages, mostly from Scandinavian countries, continue to be booked regularly and it is expected that this business will continue to expand as the war in Europe is prosecuted. Domestic buying is very slow, with single carlots now being considered desirable business. A PHILADELPHIA district shipyard is low bidder on two cruisers taking about 6000 tons of steel, about half of which will be fabricated material, and another 4000 tons will probably be placed by another shipbuilder within the next two weeks. Domestic prices appear to be holding to the published levels, but 2.25c. per lb., f.a.s., has been done on some large lots of export material. On small export tonnages, 2.35c., f.a.s., still prevails.

REINFORCING BARS

. . . Price concessions are being more generally recognized

PRICE cutting on reinforcing bars, which up until about 10 days ago had been confined to certain localities, now appears to be fairly general throughout the major centers in the country. Although some projects are still being awarded at the full published prices, other jobs have been taken at from $3 to $5 below the published prices. This condition, however, is not unusual as concrete bar prices have always been subject to irregularities when mills have found it feasible to take additional bar tonnage following periods of extremely active merchant bar operations.

Reinforcing steel awards of 6200 tons include no job of more than 910 tons. Reinforcing steel projects of 9600 tons are mostly in small lots. The two largest are 1500 tons for the Northwestern Institute of Technology at Evanston, Ill., and 1250 tons at Rockaway, N. Y., for a Long Island Railroad grade crossing elimination.

STRUCTURAL STEEL

. . . New projects of 34,700 tons
. . . Awards 21,700 tons

FABRICATED structural steel lettings of 21,700 tons are about equal to those last week. The outstanding awards include 3560 tons for bearing piles for Sepulveda Dam, Los Angeles; 2800 tons for a Bell Telephone laboratory at Murray Hill, N. J.; 1380 tons for the Kings County Hospital, Brooklyn; 1300 tons for metal screens for the Marshall Ford Dam water outlets, Austin, Tex.; 1200 tons for a rear axle plant for the Buick Motor Car Co., Flint, Mich.; 1050 tons for a reception building at Willowbrook, Staten Island, and 1000 tons for a bridge over the Meramec River, between St. Louis and Jefferson Counties, Mo.

Structural steel projects jumped to 34,705 tons from 11,330 tons in the previous week. New inquiries reported are 13,000 tons for an elevated highway in Queens, N. Y.; 10,000 tons for a Long Island Railroad grade crossing elimination at Rockaway, N. Y.; 3000 tons near Baldwin, La., for a railroad swing bridge over the Clarenton Drainage and Navigation Canal; 1800 tons for a borough hall at Kew Gardens N. Y., and 1500 tons near Calumet, La., for a railroad bridge over Wax Lake outlet.

The Board of Supervisors of Erie County, N. Y., has announced that there will be 17 grade-crossing elimination projects during the current year with a total cost of about $4,000,000.

BOLTS, NUTS AND RIVETS

. . . Orders in small total volume
. . . Upturn expected soon

IN general, bolt and nut orders are reduced both as to tonnage and dollar volume. Some plants report that the numerical volume is fair but individual business is light. One cap screw manufacturer at CLEVELAND reports February dollar volume of shipments running slightly ahead of January, but this apparently is an exception to the rule in the industry. Although new business is off, operations of most producers at CLEVELAND have not receded a whole lot from the December level. On all sides confidence is expressed of an upturn, but how soon nobody knows. All producers are hesitant to make price concessions.

RAILROAD BUYING

. . . Inquiries and orders are in small volume

CLASS I railroads put 4983 new freight cars in service in January, the largest number for any January since 1930, and had 34,559 freight cars on order at the end of the month, a number five times greater than the number on order in the corresponding period of both 1939 and 1938, according to the Association of American Railroads. New locomotives put into service in January totaled 19, of which 15 were electric or diesel, as compared with 17 in January, 1939, and 44 in January, 1938. At the end of the month 139 locomotives were on order, as against 84 on the same date a year ago and 131 in 1938.

Toronto (Canada) Transportation

Commission has ordered 50 streamlined street cars from Canadian Car & Foundry Co. at a cost of $1,150,000. Several other street car companies are interested in obtaining this type car and substantial orders are pending completion of negotiations with Canadian Car & Foundry Co.

New purchases reported during the week include 50 hopper cars and 10 gondolas for the Nickel Plate Road and four diesel-electric locomotives for Northern Pacific. The hopper cars went to American Car & Foundry Co. and the gondolas were placed with Pullman-Standard Car Mfg. Co. Baldwin Locomotive Works was awarded one locomotive and three were placed with Electro-Motive Corp. Denver & Rio Grande Western is taking bids on 10 cabooses. Atlantic Coast Lines is rebuilding 1000 box cars at its shops at Waycross, Ga.

TUBULAR GOODS

. . . Oil country orders are smaller than a month ago

OIL country specifications at PITTSBURGH do not compare favorably with tonnage booked at this time a month ago. Some producers are utilizing the current period for building up warehouse inventories. Standard pipe demand has been affected somewhat by unseasonable weather but warehouse stocks are not believed to be excessively large.

The movement of merchant pipe at CLEVELAND is holding up satisfactorily. Export shipments have been good. Tonnage orders are slower for both line pipe and oil country casing. Two government housing projects in Ohio will require fair amounts of merchant pipe before long.

MERCHANT BARS

. . . Backlogs may soon disappear as new buying lags

TOTAL hot rolled bar specifications at PITTSBURGH remain somewhat under the level of the volume booked during the same number of days last month. Backlogs are being rapidly reduced and deliveries are easier. Fresh buying is looked for by the middle of March.

Some CHICAGO mills still have a fair tonnage of bars on the books, but shipment against those orders is proceeding at a swift pace. Backlogs will be entirely gone within a short while if new business does not gain soon. The farm equipment industry, normally a large buyer of bars, apparently is carrying on its current heavy production with the aid of steel in stock or on order, for new business from this source is scanty.

The price structure of merchant bars is declared by CLEVELAND sellers to be in better shape today than a month ago when apprehension was felt over whether the extras announced last fall would be accepted without grumbling by the trade. Incoming merchant bar orders remain light at CLEVELAND.

SEMI-FINISHED STEEL

. . . A slight improvement continues in demand from non-integrated mills

THE pick-up in semi-finished steel demand at PITTSBURGH, reflecting more activity among non-integrated steel makers, continues and a slight gain was registered in the past week. Whether or not this reversal in the trend of incoming semi-finished specifications is significant, of course, remains to be seen.

Demand for wire rods is very light at CLEVELAND and YOUNGSTOWN. Apparently bolt and nut plants are slow in digesting stock on hand. Export inquiries are reported well maintained.

SHEETS AND STRIP

. . . New business is light and deliveries are shortening

AGGREGATE sheet and strip business at PITTSBURGH is running ahead of the incoming rate of a month ago but only because business placed at that time was in unusually low volume. Orders are still characterized as "odds and ends" and average tonnage involved in incoming orders is relatively small. No important automotive buying is expected before the middle of March. Miscellaneous customers remain on the sidelines unless demand calls for filling-out sizes.

At CLEVELAND conditions remain much the same as those which have prevailed since the start of this quarter. Orders are light and shipments and production are falling. One bright spot, however, has been releases from refrigerator plants, where activity seems to be well maintained.

Cold rolled, enameling stock, flat galvanized and hot rolled, the latter in 20 gage and lighter, are available in four to five weeks from a large CHICAGO producer. Heavy hot rolled sheets may be obtained in 10 days to two weeks. Buying by Motor companies is expected in the near future. General buying is quiet in the CHICAGO area and no pickup is in sight.

WIRE PRODUCTS

. . . Barbed wire and twisted barbless wire on new price basis

WIRE rod sales at PITTSBURGH are about on a par with a week ago but the volume of incoming manufacturers' wire specifications remains below that of a month ago. The setback given merchant wire business because of bad weather conditions throughout the country has not been corrected, although producers are looking for a moderate pick-up for spring requirements soon.

CLEVELAND producers have placed barbed wire and twisted barbless wire on a zone basis similar to the method of quoting fence. Straight carload lots of barbed wire in 80-rod spools are quoted column 70. Barbless wire in 80 rod and 100 rod and 100 lb. spools is also column 70. The new arrangement, a more simplified method of quoting than heretofore, will result in additional absorption in some instances by mills and less absorption in other cases. Where the freight rate is 21c. per 100 lb., the producer charges only four columns, or 20c per 100 lb. Wire nails still go on the actual freight basis.

With the gradual tempering of winter weather in the Middle West, wire sellers are looking forward to the seasonal influx of orders for merchant products from the farming districts. Sales of industrial wire to CHICAGO district consumers are slow.

TIN PLATE

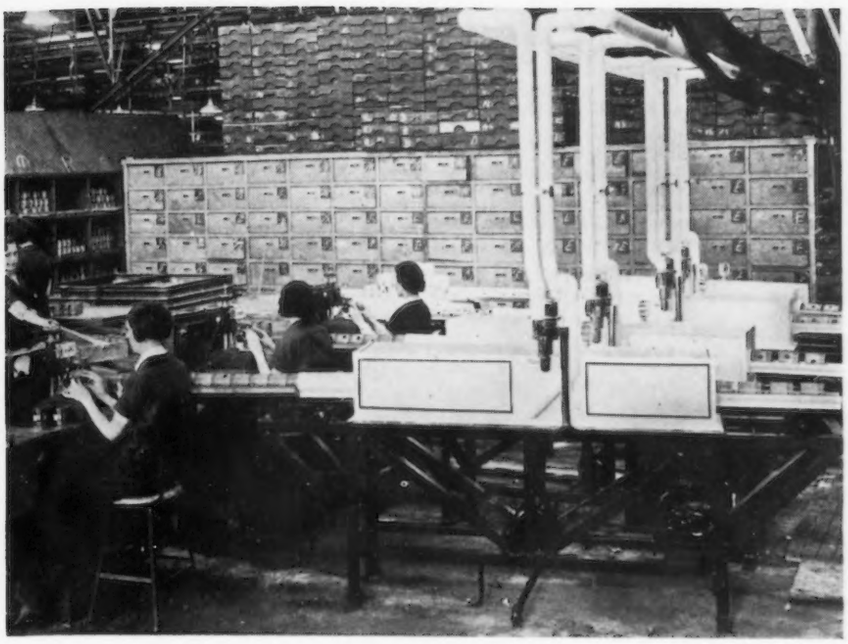
. . . Operations go lower . . . Now at 57%

TIN plate operations this week are estimated at 57 per cent, which reflects a further adjustment in activity to conform to the volume of incoming business. Actual tin plate specifications are slightly improved from a week ago but no important volume of releases is expected in the near future.

SHIPBUILDING

. . . Navy gets bids on two light cruisers

APPROXIMATELY 5400 tons of steel, exclusive of high tensile material, will be required for the two 10,000-ton light cruisers on which bids were opened last Friday by the Navy Department. The Bethlehem Steel Co.



"REFRIGERATION" of parts prior to inspection is the unusual step taken by Plymouth to assure accuracy. These piston cooling tunnels were devised by Plymouth engineers to bring the temperature of every piston down to 70 degrees F. previous to inspection on electric gages. The pistons are aluminum alloy with a stannic coating as a protection during engine break-in. The pistons have been tin-coated, then rinsed in hot water to remove all traces of foreign matter and chemicals, so the cooling is necessary to bring the pistons to room temperature.

Dustless Cleaning Of Large Castings

CASTINGS up to 24 in. are being cleaned in the foundry of a large electrical manufacturer by a new type of machine which is a combination of a side loading wet tumbling barrel, an automatic end unloading and star separation barrel, and a continuous sand settler and remover. The castings are hand packed in the tumbling section, which fills itself with stars as soon as the machine is started. During tumbling the contents are flushed with a mild caustic solution which carries away the sand as fast as it is loosened by the stars. This sand is carried to a settling tank from where it is continuously removed by flight conveyor. By reversing the machine, the work is discharged over a rotating screen, which automatically separates out the stars for use with the next batch. Complete cycle is 50 min. Besides saving the time of hand unloading and star separation, it is stated that cleaning time is reduced and dust is eliminated at its source. This unit was built by N. Ransohoff, Inc., Cincinnati.

submitted a bid for its Quincy, Mass., shipbuilding plant of $19,200,000 for the construction of one ship and $18,190,000 each if it received the contract for both. Respective bids submitted by the New York Shipbuilding Corp., Camden, N. J., were $20,425,000 and $17,990,000. Bids of both companies provide for labor-material cost adjustment.

Bethlehem Studies Iron Ore Development in Venezuela

BETHLEHEM STEEL CO., through a subsidiary, Iron Mines Co. of Venezuela, has applied to the Venezuelan government for permission to develop an iron mine it has owned for more than 25 years in the Piar district of the state of Bolivar.

A study of the project, already started by representatives of the Bethlehem company, is expected to take from six to eight months. General economic conditions when the survey is concluded will, Bethlehem officials indicate, determine where the Venezuelan mine will be operated.

Westinghouse Forum May 6-8

PITTSBURGH — The Westinghouse Electric & Mfg. Co.'s annual Machine Tool Electrification Forum will be held at East Pittsburgh May 6, 7, and 8. As in former years, important papers and discussions will feature the meeting.

Mork Foundries, Inc., 132 Blackhawk Boulevard, South Bend, Ill., has recently been organized to operate a gray iron foundry. It will occupy the buildings formerly used by the P. F. Mork Foundry and the Slater and Tuck Foundry. They will manufacture castings for the machine tool trade and allied lines. Officers of the corporation are F. H. Mork, president, and H. C. Mork, treasurer.

Weekly Bookings of Construction Steel

	Week Ended				Year to Date	
	Feb. 20, 1940	Feb. 13, 1940	Jan. 23, 1940	Feb. 21, 1939	1940	1939
Fabricated structural steel awards	21,700	21,760	10,450	13,500	127,460	152,950
Fabricated plate awards	800	0	16,750	2,555	23,935	28,255
Steel sheet piling awards	2,135	100	0	0	4,585	7,960
Reinforcing bar awards	6,200	11,225	7,000	3,100	60,470	82,895
Total Letting of Construction Steel	30,835	33,085	34,200	19,155	216,450	272,060

FABRICATED STEEL

NORTH ATLANTIC STATES

AWARDS

2800 Tons, Murray Hill, N. J., Bell laboratory, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

1380 Tons, Brooklyn, Kings County Hospital, to Lehigh Structural Steel Co., Allentown, Pa.

1050 Tons, Willowbrook, Staten Island, reception building, to Belmont Iron Works, Philadelphia.

675 Tons, Elkton, Md., Little Elk River bridge, to American Bridge Co., Pittsburgh.

550 Tons, Willowbrook, Staten Island, building No. 418, to Bethlehem Steel Co., Bethlehem, Pa., through Andrews & Andrews, contractors.

425 Tons, Bound Brook, N. J., Calco Chemical Co., warehouse, to Harris Structural Steel Co., Plainfield, N. J.

350 Tons, New York, addition to Herald Square Building, 35th Street and Broadway, to Taylor-Fichtor Steel Construction Co., New York.

310 Tons, Marcus Hook, Pa., case supports for Sun Oil Co., to Belmont Iron Works, Philadelphia.

300 Tons, Providence, R. I., Narragansett Electric Co. turbine and boiler unit, to James H. Tower Co., Providence.

275 Tons, New York, warehouse addition for Wamkill Realty Corp. in Bronx, to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Malden, Mass., bakery, to A. O. Wilson Co., Boston.

180 Tons, Piermont, N. Y., power house and coal bunker for Gair Cartons, Inc., to American Bridge Co., Pittsburgh.

180 Tons, Fairfield, Conn., repairs to bridges, to American Bridge Co., Pittsburgh.

175 Tons, Weston, Mass., Charles River shaft, to an unnamed fabricator.

165 Tons, New York, curbing, etc., for New York City Parkway Authority, to Bethlehem Steel Co., Bethlehem, Pa.

130 Tons, Dormont, Pa., store building, to an unnamed bidder.

THE SOUTH

1300 Tons, Austin, Tex., metal screens for water outlets at Marshall Ford Dam on Colorado River, to Stupp Brothers Bridge & Iron Co., St. Louis.

880 Tons, Macon, Ga., Georgia Power Co. steam plant, to Virginia Bridge Co., Roanoke, Va.

750 Tons, Chickasaw, Ala., Alabama Power Co. steam plant, to Virginia Bridge Co., Roanoke, Va.

500 Tons, York County, S. C., bridge, to Nashville Bridge Co., Nashville, Tenn.

475 Tons, Wythe County, Va., bridge, to Virginia Bridge Co., Roanoke, Va.

415 Tons, State of Texas, State highway bridges, to Mosher Steel Co., Dallas, Tex.

395 Tons, Charleston, W. Va., office building, to American Bridge Co., Pittsburgh.

265 Tons, Mobile, Ala., National Gypsum Co. warehouse, to Mobile Steel Co., Mobile, Ala.

CENTRAL STATES

1200 Tons, Flint, Mich., rear axle plant for Buick Motor Division, to R. C. Mahon Co., Detroit.

1000 Tons, St. Louis and Jefferson Counties, Mo., State highway bridge over Meramec River, to Stupp Brothers Bridge & Iron Co., St. Louis, through Massmann Construction Co., Kansas City.

515 Tons, Lucas County, Ohio, State bridge over Ottawa River, to Bethlehem Steel Co., Bethlehem, Pa., through A. Bentley & Sons.

300 Tons, Flint, Mich., crane runway extension for Buick Motor Division, to Flint Structural Steel Co., Flint.

240 Tons, Cleveland, Cleveland Pneumatic Tool Co., extension to mill building, to Burger Iron Co., Akron, Ohio.

223 Tons, Dubuque, Iowa, Illinois Central bridge, to American Bridge Co., Pittsburgh.

185 Tons, Cleveland, W. T. Grant store, to Bethlehem Steel Co., Bethlehem, Pa.

122 Tons, Calhoun County, Iowa, State bridge to Pittsburgh-Des Moines Steel Co., Des Moines, Iowa.

100 Tons, Rock Island, Ill., city court house and jail, to Rock Island Bridge Co., Rock Island.

100 Tons, Evansville, Ind., Coca-Cola plant, to International Steel & Iron Co., Evansville, Ind.

WESTERN STATES

3560 Tons, Los Angeles, Sepulveda Dam bearing piles, to Columbia Steel Co., San Francisco, through Jahn-Bressi-Bevanda, J. A. Dowling and David G. Gordon, Los Angeles, contractors.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

13,000 Tons, Queens, N. Y., elevated highway; bids Feb. 28.

10,000 Tons, Rockaway, N. Y., Long Island Railroad grade crossing elimination, contract No. 2; bids Feb. 28.

1800 Tons, Kew Gardens, Long Island, Borough Hall.

800 Tons, New York, apartment building, Lexington Avenue and 56th Street.

400 Tons, Bristol, R. I., factory building for Collins & Aikman Corp.

400 Tons, Edgewater, N. J., building for Aluminum Co. of America.

300 Tons, Farmingdale, Long Island, factory building.

270 Tons, Malverne, N. Y., alterations to high school.

240 Tons, Wawarsing, N. Y., highway bridges, contract No. 343.

200 Tons, New York, alterations to subway in Bronx.

150 Tons, Bethlehem, Pa., Central Bowling Academy building.

140 Tons, Pittsburgh, factory building for Edwin L. Wiegand Co.

120 Tons, Milford, Conn., Wilbur Cross Parkway State bridge.

THE SOUTH

3000 Tons, Baldwin, La., railroad swing bridge over Clarenton Drainage and Navigation Canal; bids March 19.

1500 Tons, Calumet, La., railroad bridge over Wax Lake outlet; bids March 19.

300 Tons, Fort Monroe, Va., submarine mine depot.

CENTRAL STATES

400 Tons, Genoa, Wis., Tri-State Power Cooperative power house; bids Feb. 29.

226 Tons, State of Missouri, highway bridge; bids Feb. 23.

186 Tons, Allen Park, Mich., bridge for Wayne County Road Commission.

175 Tons, Chicago, subway stations, section D2A; bids Feb. 29.

150 Tons, Cleveland, Pepsi-Cola building.

100 Tons, Cleveland, Turn Verein Hall.

WESTERN STATES

700 Tons, Mare Island, Cal., dry dock No. 4 for Navy Department.

150 Tons, Earp, Cal., overhead traveling crane for Parker power plant (Specifications 1329-D); bids Feb. 28.

FABRICATED PLATES

AWARDS

500 Tons, Los Angeles, crest gates for Sepulveda Dam, to Consolidated Steel Corp., Los Angeles.

300 Tons, Pollock, Cal., tunnel supports for Southern Pacific relocation (Specifications 861), to Wetern Pipe & Steel Co., San Francisco, through Ralph E. Bell, Monrovia, Cal., contractor.

PENDING PROJECTS

500 Tons, Toledo, elevated water tank for city; bids March 6.

135 Tons, Coram, Cal., by-pass and air inlet piping for main unit penstocks of Shasta Dam (Specifications 1330-D); bids Feb. 26.

SHEET PILING

AWARDS

1925 Tons, Los Angeles, Sepulveda Dam, to Columbia Steel Co., San Francisco, through Jahn-Bressi-Bevanda, J. A. Dowling and David G. Gordon, Los Angeles, contractors.

211 Tons, Bremerton, Wash., quay wall, to Bethlehem Steel Co., Seattle, through General Construction Co., Seattle.

PENDING PROJECTS

713 Tons, Beaumont, Tex., bridge across Neches River for Kansas City Southern Railway.

House Committee Hears NLRB "Held Up" RFC Loans to Industry

WASHINGTON—After hearing testimony on Tuesday from officials of the Reconstruction Finance Corp., and the Treasury's Procurement Division, the special House Committee investigating the labor board decided to study records supplied by Labor, Navy and Interior departments before calling for further testimony on the reaction to the NLRB request that Government contracts and loans be withheld from companies involved in Wagner act charges.

RFC chairman Emil Schram conceded that on three occasions, his agency had ordered disbursements of loans held up at the suggestion of the NLRB but that it had "no standing agreement" with the board.

"Naturally when information comes to us and we consider it valuable and necessary information that a borrower has violated the law, then we think it is incumbent upon us to make an investigation to determine how that will affect the credit of that particular company," Mr. Schram told the committee.

Frank Healy, special assistant to the Director of Procurement, testified that, to an NLRB request that a Government contract be withheld from Remington-Rand Corp., the Procurement Division responded that it could not write into contracts any provision that would restrain competition or raise prices without an express mandate from Congress.

Meanwhile, the House Judiciary Committee opened hearings Wednesday on the CIO-NLRB move to broaden the Walsh-Healey Public Contracts Act—a development which was interpreted as an attempt to divert attention from the revelations uncovered by the Smith committee. Under the proposal, sub-contractors would be subjected to provisions of the law for the first time, the contract limit would be lowered to $4,000, and violators of the Wagner Act would be denied Government contracts.

. . . NON-FERROUS . . .

. . . Copper producers raise quotations ¼c. . . . Demand for lead is maintained in good volume . . . Zinc market still in the doldrums.

NEW YORK, Feb. 20—The publication of the favorable January copper statistics and a fairly active export demand in nearby positions broke the deadlock in the copper market last week and brought out a strong demand from domestic consumers. On Thursday sales rose to slightly over 5000 tons and over the week-end 11,300 tons were sold. The foreign demand was well sustained all week, with France, Belgium and Switzerland reported especially active in nearby positions. This sharp transformation in sentiment brought a run-up in the export price to around 11.75c. per lb., f.a.s., for March shipment. The domestic market also reacted upward, with several leading producers this morning posting a price of 11.50c. per lb., Connecticut Valley, an increase of ¼c. While some speculative buying was apparent in the week's activities, by far the largest portion of the buying was for the account of domestic fabricators.

Zinc

The bullishness which pervaded the copper market in the past week had no apparent influence on spelter buying and the week's sales totaled only 1161 tons, as compared with around 1800 in the preceding week. The week's shipments were 3237 tons, or 500 tons below a week ago, and order backlogs were further reduced. Prices remained unchanged at 5.89c. per lb., New York. The zinc market has resolved itself into a matter of watchful waiting and in view of the reversal in the undertone of the copper and lead markets it is unlikely that further price cuts will be made. This fact, together with the abnormally low level of sellers' backlogs makes it appear probable that an improvement in sales is not far off.

Lead

A strong demand for lead continued throughout the past week and more than one seller developed a waiting list over the week-end. Practically all the major lead consumers were active in the week's buying, except the automobile battery makers. Chief demand was for March, which at present is about 60 per cent covered, but occasional February fill-in lots are still being booked. Quotations are firm at 5c. per lb., New York.

Tin

The market is somewhat stronger on the strength of persistent rumors that second quarter quotas will be reduced by the International Control Committee at its meeting next week. These reports brought out a moderate amount of consumer buying, but this was matched by a continuance of importers' reluctance to sell pending the committee's decision. After experiencing a spell of easiness on Thursday and Friday, prices strengthened over the week-end and today Straits is quoted at 46c. per lb., New York.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Feb. 14	Feb. 15	Feb. 16	Feb. 17	Feb. 19	Feb. 20
Copper, Electrolytic[1]	11.25	11.25	11.25	11.25	11.25	11.50
Copper, Lake	11.25	11.25	11.25	11.25	11.25	11.50
Tin, Straits, New York	45.625	45.25	45.125	....	45.375	46.00
Zinc, East St. Louis[2]	5.50	5.50	5.50	5.50	5.50	5.50
Lead, St. Louis[3]	4.85	4.85	4.85	4.85	4.85	4.85

[1] Delivered Conn. Valley. Deduct ¼c. for New York delivery. [2] Add 0.39c. for New York delivery. [3] Add 0.15c. for New York delivery.

Warehouse Prices

Cents per lb., Delivered

	New York	Cleveland
Tin, Straits, pig	46.75c.	48.50c.
Copper, Lake	13.25c.	12.75c.
Copper, electro	12.75c.	12.75c.
Copper, castings	12.375c.	12.375c.
*Copper sheets, hot-rolled	19.87c.	19.87c.
*Yellow brass sheets	18.15c.	18.15c.
*Seamless brass tubes	20.90c.	20.90c.
*Seamless copper tubes	20.37c.	20.37c.
*Yellow brass rods	14.11c.	14.11c.
Zinc slabs	6.85c.	7.50c.
Zinc sheets, No. 9 casks	12.00c.	13.35c.
Lead, American pig	6.00c.	5.50c.
Lead, bar	8.45c.	8.25c.
Lead, sheets, cut	8.50c.	8.50c.
Antimony, Asiatic	16.00c.	17.00c.
Alum., virgin, 99 per cent plus	21.50c.	22.50c.
Alum., No. 1 remelt., 98 to 99 per cent	19.00c.	19.50c.
Solder, ½ and ½	29.25c.	28.375c.
Babbitt metal, anti-friction grade	27.50c.	20.00c.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33⅓; on brass sheets and rods, 40; on brass tubes, 33⅓, and copper tubes, 40.

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.25c.	9.875c.
Copper, hvy. and wire	8.25c.	8.625c.
Copper, light and bottoms	7.25c.	7.75c.
Brass, heavy	5.00c.	5.50c.
Brass, light	4.125c.	4.875c.
Heavy machine composition	7.375c.	8.00c.
No. 1 yel. brass turnings	4.75c.	7.75c.
No. 1 red brass or compos. turnings	7.00c.	7.50c.
Lead, heavy	4.00c.	7.375c.
Cast aluminum	8.00c.	9.00c.
Sheet aluminum	13.75c.	14.75c.
Zinc	2.75c.	4.00c.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 20c.-21c. a lb.; No. 12 remelt No. 2 standard, 19c.-19.50c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, nominally, $183 to $185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

Republic Mill Improved

IMPROVEMENTS in Republic Steel Corp.'s No. 3 hot strip mill and open hearth crane runway at Warren, Ohio, were announced by F. E. Flynn, manager of Republic's Warren-Niles district. A new billet heating furnace, with a capacity for 30-ft. billets, as compared with a 15-ft. billet capacity in the present furnace, together with a rearrangement in the roughing, intermediate and finishing stands, is being installed. A new swing type, hot cut shear is being placed at the discharge side of the furnace and the present horizontal edgers are being replaced by a motor-driven edger and four push-type edgers.

The improvements will provide longer coils to meet the demands of customers and will increase the capacity of the mill. The crane runway in the open hearth department is being strengthened to permit the handling of 170-ton heats and improved equipment is being installed for the charging of open hearth furnaces.

IRON AND STEEL SCRAP

. . . Markets continue to decline in absence of mill buying . . . Composite price drops 29c. to $16.71.

FEB. 20—Based almost entirely on broker coverages and offers to mills rather than on any actual mill sales, prices on No. 1 heavy melting steel in all three markets used as a basis for computing the composite price have declined from 12½c. to 50c., resulting in a drop in that price of 29c., from $17 to $16.71. The composite price is now approximately the same as that prevailing on Sept. 12, but is still $1 above the late August level. Elsewhere than at Chicago, Pittsburgh and Philadelphia, the markets are listless and generally on the soft side also. Small mill sales at Cleveland have depressed the whole list there 50c., but at Youngstown prices are nominally unchanged in the absence of sales. No sales are reported at Buffalo either and some specialties have been marked down. Dealers' buying prices at St. Louis have been reduced 25c. on the average. New York buying prices are lower on Nos. 1 and 2 steel in conformity with the softness at Philadelphia. Prices at Detroit and Birmingham are unchanged.

The Japanese have recently entered the market for relatively small tonnages, mostly to be shipped from the West Coast. Some rails are being taken out of Gulf ports, but no heavy melting grades have been bought in the East.

Pittsburgh

Scrap transactions are few and far between and the market is listless. Brokers are able to pick up odd cars of No. 1 heavy melting at $17 and small sales of No. 1 steel into consumption have been made recently at between $17 and $17.50 a ton. Brokers have also offered to sell moderate tonnages at $17.50. Consequently, on appraisal, No. 1 heavy melting steel is quotable this week at $17 to $17.50, off 50c. a ton from last week. Railroad specialties are softer and mixed borings and turnings and cast iron borings have slumped substantially over the past several weeks owing to lack of demand and the completion of previous orders.

Chicago

The last mill purchase price remains at $16.50 and it is doubted that an important tonnage will be bought soon. Operations continue to decline and shipments of scrap into some mills are on a quota basis. Brokers are experiencing slightly more difficulty in buying steel for $15.50 than was the case a week ago but material can still be acquired at that price. Heavy melting steel is quoted this week at $15.50 to $15.75, the top representing the highest price brokers believe a mill would pay today. Several brokers feel the low mark of the current price decline has been reached but this may be wishful thinking since neither operations, backlogs nor new orders at the mills are such as to cause bullishness at this time. A Rock Island list consisting of 20 cars of No. 1 steel closed early this week.

Philadelphia

The continued decline in open-hearth operations has served to extend the coverage provided by present mill inventories and existing commitments and is limiting new purchases to small, infrequent lots. In consideration of the market undertone, the $1 spread in No. 1 steel has been reduced to 50c. this week, and judging from recent broker offerings it appears unlikely that any mill would buy at the upper end of the present quoted range of No. 1 and No. 2 steel. Blast furnace material was purchased in the past week within the quoted price spread. Machine shop turnings, however, are down $1 this week, and cast borings are off 50c. There are signs of greater activity in the export market. A cargo of about 7000 tons cleared Port Richmond last week and another boat is expected on the 26th. There has been some buying for this 3500-ton cargo at $17 for No. 1 and $15.50 to $15.75 for No. 2.

Youngstown

Scrap has been very quiet here recently and prices are nominal. A number of releases against old orders have been coming out but are easy to fill. Some dealers are understood to be laying down automotive scrap instead of sacrificing at present prices. Electric furnace grades continue in good demand in this vicinity.

Cleveland

Orders distributed here for mill consumption during the past week indicate the top on No. 1 heavy melting steel is now $16.50 per ton, down 50c. from last week's quotation. Tonnage volume has been small. The outlook shows no improvement.

Buffalo

Since the sales of a week ago no further activity has been reported in the market and no additional weakness has been noted. Outside of an occasional carload, cast scrap is not very active. Specialties are nominally reduced in the face of almost complete inactivity.

St. Louis

The scrap iron market is softer and dealers' buying prices have been reduced for the most part 25c. a ton, with a few items 50c. off. Mills are not buying, because of satisfactory inventories and recent heavy commitments. Shipments from the country have been better with moderation of the weather. Railroad lists: Chicago, Burlington & Quincy, 3000 tons; Louisville & Nashville, 3700 tons; Missouri-Kansas-Texas, 650 tons, and Chicago, Rock Island & Pacific, 450 tons.

Cincinnati

The downward trend of dealers' bids was halted during the past week, when prices failed to bring out any more material. Mill interest in scrap material is almost nil, and dealers refuse to make prices more attractive to stimulate ordering. Foundry grades, however, continue to be fairly active.

Birmingham

The absence of consumer buying has resulted in a continuation of dullness in the local scrap market. Prices have remained unchanged for the past week with the likelihood that the present status will last out the month, maybe longer. Yard accumulation has remained stationary, since it is difficult to get materials to centrally located yards. The larger buyers are still out of the market.

New York

Dealers' buying prices on Nos 1. and 2 steel on cars for domestic shipment have been lowered 50c. a ton in keeping with the softness in the eastern Pennsylvania market. Rails for rolling are also lower as well as turnings. Bad weather has slowed up collections in the last week, but there is ample material on hand to meet present boat schedules. The Japanese have entered the market for the first time since the trade treaty abrogation. The tonnages placed were small and most of the material is to be shipped from the West Coast, with the exception of some rails that are going out of Gulf ports.

Boston

The blizzard that hit New England on Feb. 14 paralyzed the scrap industry. By the week end many yards were able to get trucks operating again, but the situation was still very badly tied up as far as making shipments by rail were concerned. As a result, operations at the Army Base and Mystic docks, whose boats are loading, came to a complete standstill. It is expected, however, the situation will have righted itself by Washington's Birthday. As might be expected under the circumstances, prices with one exception have not changed.

Detroit

There has simply been no activity at all in the Detroit market during the last week and prices are unchanged.

Toronto

Demand for iron and steel scrap continues to improve, with most grades of materials active during the past week or 10 days. Steel mills and electric operators are in the market for heavy melting steel and soft steel. During the past few days a special call was received for turnings, for which one local dealer jumped his offering price to $9 per ton. This advance over the list price of $6.50 was for a day or two only, however, and by the end of the week prices were back to the old level. Machinery cast and stove plate were in better demand from local consumers, although melters in other areas showed little interest. No price changes were announced for the week.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
Railroad heavy melting	18.00 to 18.50
No. 2 heavy melting	15.50 to 16.00
Railroad scrap rails	18.00 to 18.50
Rails 3 ft. and under	20.50 to 21.00
Comp. sheet steel	17.00 to 17.50
Hand bundled sheets	16.00 to 16.50
Heavy steel axle turn.	15.00 to 15.50
Machine shop turnings	10.50 to 11.00
Short. shov. turnings	12.00 to 12.50
Mixed bor. & turn.	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron carwheels	18.50 to 19.00
Heavy breakable cast.	15.00 to 15.50
No. 1 cupola cast	18.00 to 18.50
RR. knuckles & coup.	20.50 to 21.00
Rail coil springs	20.50 to 21.00
Rail leaf springs	20.50 to 21.00
Rolled steel wheels	20.50 to 21.00
Low phos. billet crops.	21.50 to 22.00
Low phos. punchings	21.00 to 21.50
Low phos. heavy plate.	19.50 to 20.00
Railroad malleable	21.00 to 21.50

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
Hydraulic bund., new.	17.00 to 17.50
Hydraulic bund., old.	14.00 to 14.50
Steel rails for rolling	20.50 to 21.00
Cast iron carwheels	20.00 to 20.50
Hvy. breakable cast	.... 18.00
No. 1 cupola cast	20.00 to 20.50
Mixed yard (f'd'y) scrap	16.50 to 17.00
Stove plate (steel wks.)	.... 15.00
Railroad malleable	21.00 to 22.00
Machine shop turn.	10.50 to 11.00
No. 1 blast furnace	10.00 to 10.50
Cast borings	10.50 to 11.00
Heavy axle turnings	15.00 to 15.50
No. 1 low phos. hvy.	21.00 to 21.50
Couplers & knuckles	21.00 to 21.50
Rolled steel wheels	21.00 to 21.50
Steel axles	21.50 to 22.00
Shafting	23.00 to 23.50
Spec. iron & steel pipe	16.50 to 17.00
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

	Per Gross Ton
Hvy. mltng. steel	$15.50 to $15.75
Auto. hvy. mltng. steel	
alloy free	14.50 to 15.00
No. 2 auto steel	12.50 to 13.00
Shoveling steel	15.50 to 16.00
Factory bundles	14.75 to 15.25
Dealers' bundles	13.25 to 13.75
No. 1 busheling	14.50 to 15.00
No. 2 busheling, old	5.75 to 6.25
Rolled carwheels	18.00 to 18.50
Railroad tires, cut	18.25 to 18.75
Railroad leaf springs	17.75 to 18.25
Steel coup. & knuckles	17.75 to 18.25
Axle turnings	14.75 to 15.25
Coil springs	18.75 to 19.25
Axle turn. (elec.)	16.75 to 17.25
Low phos. punchings	18.00 to 18.50
Low phos. plates 12 in. and under	18.75 to 19.25
Cast iron borings	9.00 to 9.50
Short shov. turn.	9.50 to 10.00
Machine shop turn.	8.75 to 9.25
Rerolling rails	18.25 to 18.75
Steel rails under 3 ft.	18.25 to 18.75
Steel rails under 2 ft.	19.25 to 19.75
Angle bars, steel	17.75 to 18.25
Cast iron carwheels	17.00 to 17.50
Railroad malleable	18.25 to 18.75
Agric. malleable	14.25 to 14.75
	Per Net Ton
Iron car axles	21.50 to 22.00
Steel car axles	20.25 to 20.75
Locomotive tires	14.25 to 14.75
Pipes and flues	10.75 to 11.25
No. 1 machinery cast	13.50 to 14.00
Clean auto. cast	13.75 to 14.25
No. 1 railroad cast	13.25 to 13.75
No. 1 agric. cast	12.00 to 12.50
Stove plate	8.75 to 9.25
Grate bars	9.50 to 10.00
Brake shoes	10.50 to 11.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$17.00 to $17.50
No. 2 hvy. mltng. steel.	16.00 to 16.50
Low phos. plate	20.00 to 20.50
No. 1 busheling	16.25 to 16.75
Hydraulic bundles	16.50 to 17.00
Machine shop turn.	11.00 to 11.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel.	15.00 to 15.50
Comp. sheet steel	15.50 to 16.00
Light bund. stampings	13.00 to 13.50
Drop forge flashings	14.00 to 14.50
Machine shop turn.	9.00 to 9.50
Short shov. turn.	10.00 to 10.50
No. 1 busheling	14.75 to 15.25
Steel axle turnings	14.50 to 15.00
Low phos. billet and bloom crops	21.50 to 22.00
Cast iron borings	10.00 to 10.50
Mixed bor. & turn.	10.00 to 10.50
No. 2 busheling	10.00 to 10.50
No. 1 cupola cast	17.00 to 17.50
Railroad grate bars	13.50 to 14.00
Stove plate	13.50 to 14.00
Rails under 3 ft.	21.00 to 21.50
Rails for rolling	20.00 to 20.50
Railroad malleable	19.50 to 20.00

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	$16.00 to $16.50
No. 2 hvy. mltng. steel.	14.00 to 14.50
Scrap rails	17.00 to 17.50
New hvy. b'ndled sheets	14.00 to 14.50
Old hydraul. bundles	12.50 to 13.00
Drop forge flashings	14.00 to 14.50
No. 1 busheling	14.00 to 14.50
Machine shop turn.	9.50 to 10.00
Shov. turnings	12.50 to 13.00
Mixed bor. & turn.	10.50 to 11.00
Cast iron borings	10.50 to 11.00
Knuckles & couplers	20.00 to 21.00
Coil & leaf springs	20.00 to 21.00
Rolled steel wheels	20.00 to 21.00
No. 1 machinery cast	17.50 to 18.00
No. 1 cupola cast	16.50 to 17.00
Stove plate	14.50 to 15.00
Steel rails under 3 ft.	21.50 to 22.00
Cast iron carwheels	17.50 to 18.00
Railroad malleable	19.00 to 19.50

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	$14.75 to $15.25
No. 1 hvy. melting	13.75 to 14.25
No. 2 hvy. melting	13.25 to 13.75
No. 1 locomotive tires	15.75 to 16.25
Misc. stand. sec. rails	15.50 to 16.00
Railroad springs	16.50 to 17.00
Bundled sheets	8.50 to 9.00
No. 1 busheling	13.25 to 13.75
Cast bor. & turn.	5.00 to 5.50
Machine shop turn.	6.50 to 7.00
Heavy turnings	10.00 to 10.50
Rails for rolling	17.50 to 18.00
Steel car axles	18.00 to 18.50
No. 1 RR wrought	10.25 to 10.75
No. 2 RR wrought	13.25 to 13.75
Steel rails under 3 ft.	18.00 to 18.50
Steel angle bars	15.25 to 15.75
Cast iron carwheels	16.00 to 16.50
No. 1 machinery cast	16.75 to 17.25
Railroad malleable	15.75 to 16.25
Breakable cast	13.75 to 14.25
Stove plate	10.00 to 10.50
Grate bars	10.00 to 10.50
Brake shoes	9.50 to 10.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	$13.00 to $13.50
No. 2 hvy. mltng. steel	11.00 to 11.50
Scrap rails for mltng.	17.00 to 17.50
Loose sheet clippings	8.50 to 9.00
Hydrau. b'ndled sheets	12.50 to 13.00
Cast iron borings	4.00 to 4.50
Machine shop turn.	5.00 to 5.50
No. 1 busheling	9.50 to 10.00
No. 2 busheling	3.00 to 3.50
Rails for rolling	18.50 to 19.00
No. 1 locomotive tires	14.50 to 15.00
Short rails	20.00 to 20.50
Cast iron carwheels	15.00 to 15.50
No. 1 machinery cast	16.50 to 17.00
No. 1 railroad cast	14.50 to 15.00
Burnt cast	8.00 to 8.50
Stove plate	8.00 to 8.50
Agricul. malleable	13.00 to 13.50
Railroad malleable	16.00 to 16.50
Mixed hvy. cast.	14.00 to 14.50

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	13.00
Scrap steel rails	15.00
Steel rails under 3 ft.	16.00
Rails for rolling	16.50
Long turnings	5.00
Cast iron borings	7.50
Stove plate	11.00
Steel axles	20.06
No. 1 RR wrought	14.00
No. 1 cast	15.00
No. 2 cast	11.00
Cast iron carwheels	13.00
Steel car wheels	16.00

DETROIT

Dealers' buying prices per gross ton:

No. 1 hvy. mltng. industrial steel	$13.00 to $13.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
Borings and turnings	7.00 to 7.50
Long turnings	6.50 to 7.00
Short shov. turnings	8.50 to 9.00
No. 1 machinery cast	13.50 to 14.00
Automotive cast	15.00 to 15.50
Hvy. breakable cast	10.50 to 11.00
Stove plate	9.00 to 9.50
Hydraul. comp. sheets.	13.75 to 14.25
New factory bushel	12.50 to 13.00
Sheet clippings	8.75 to 9.75
Flashings	12.00 to 12.50
Low phos. plate scrap.	13.75 to 14.25

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	$13.00 to $13.50
No. 2 hvy. mltng. steel.	11.50 to 12.00
Hvy. breakable cast	.... 14.00
No. 1 machinery cast.	16.00 to 16.50
No. 2 cast	.... 12.50 to 13.00
Stove plate	10.50 to 11.00
Steel car axles	19.00 to 20.00
Shafting	19.00 to 20.00
No. 1 RR. wrought	14.00 to 15.00
No. 1 wrought long	12.50 to 13.00
Spec. iron & steel pipe	13.50 to 14.00
Rails for rolling	18.50 to 19.00
Clean steel turnings*	.... 6.50
Cast borings*	6.00 to 6.25
No. 1 blast furnace	6.00 to 6.25
Cast borings (chem.)	Nominal
Unprepared yard scrap	7.00 to 7.50
Light iron	5.00 to 5.50

Per gross ton, delivererd local foundries.

No. 1 machin. cast	$17.50 to $19.25
No. 2 cast	16.50 to 17.00

* $1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton

Breakable cast	.... $12.65
Machine shop turn.	.... 5.15
Mixed bor. & turn.	$4.50 to 4.75
Bun. skeleton long	8.50 to 8.75
Shafting	17.00 to 17.25
Stove plate	9.75 to 10.00
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast	$17.00 to $19.00
No. 1 machine cast	17.00 to 19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel.	.... $13.00
No. 2 steel	.... 12.00

PACIFIC COAST

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel.	$10.50 to $12.50
No. 2 hvy. mltng. steel.	9.50 to 11.50

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	$11.50	$11.00
No. 1 hvy. mltng. steel.	11.00	10.50
No. 2 hvy. mltng. steel.	9.75	9.25
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	5.50	5.00
Scrap pipe	7.75	7.25
Steel turnings	6.50	6.00
Cast borings	6.00	5.50
Machinery cast	17.00 to	16.50
Dealers' cast	16.00 to	15.50
Stove plate	12.00 to	11.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges

No. 1 hvy. mltng. steel.	$14.00 to $14.50
No. 2 hvy. mltng. steel.	12.00 to 12.50
No. 2 cast	12.50 to 13.00
Stove plate	10.50 ....

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel.	.... $15.00
No. 2 hvy. mltng. steel.	.... 14.00
Rails (scrap)	$15.00 to 15.25
Stove plate	8.00 to 8.50

Philadelphia, delivered alongside boats, Port Richmond.

No. 1 hvy. mltng. steel	.... $17.00
No. 2 hvy. mltng. steel.	$15.50 to 15.75

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

Steel prices on these pages are base prices only and f.o.b. mill unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are effected by extras, deductions, and in most cases the amount of freight which must be absorbed in order to meet competition

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Rerolling only). Prices delivered Detroit are $2 higher. F.o.b. Duluth, billets only, $2 higher.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods
(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago or Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.45c.
Galveston	2.25c.

9/32 in. to 47/64 in. $3 a net ton higher. Quantity extras apply.

SOFT STEEL BARS

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Buffalo and Birmingham	2.15c.
Detroit, delivered	2.25c.
Duluth	2.25c.
Philadelphia, delivered	2.47c.
New York	2.49c.
On cars dock Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

RAIL STEEL BARS
(For merchant trade)

Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham	2.15c.
On cars dock Tex. Gulf ports	2.50c.
On cars dock Pacific ports	2.75c.

BILLET STEEL REINFORCING BARS
(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Cleveland, Youngstown or Sparrows Pt.	1.90c. to 2.15c.
Detroit, delivered	2.00c. to 2.25c.
On cars dock Tex. Gulf ports	2.25c. to 2.50c.
On cars dock Pacific ports	2.25c. to 2.50c.

RAIL STEEL REINFORCING BARS
(Straight lengths as quoted by distributers)

Pittsburgh, Chicago, Gary, Buffalo, Cleveland, Youngstown or Birmingham	1.90c. to 2.15c.
Detroit, delivered	2.00c. to 2.25c.
On cars dock Tex. Gulf ports	2.25c. to 2.50c.
On cars dock Pacific ports	2.25c. to 2.50c.

IRON BARS

Chicago and Terre Haute	2.15c.
Pittsburgh (refined)	3.75c.

COLD FINISHED BARS AND SHAFTING*

Pittsburgh, Buffalo, Cleveland, Chicago, and Gary	2.65c.
Detroit	2.70c.

* In quantities of 20,000 to 39,999 lb.

PLATES

	Base per Lb.
Pittsburgh, Chicago, Gary, Birmingham, Sparrows Point, Cleveland, Youngstown, Coatesville, Claymont, Del.	2.10c.
Philadelphia, del'd	2.15c.
New York, del'd	2.29c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.60c.
Wrought iron plates, P'tg	3.80c.

FLOOR PLATES

Pittsburgh or Chicago	3.35c.
New York, del'd	3.71c.
On cars dock Gulf ports	3.70c.
On cars dock Pacific ports	3.95c.

STRUCTURAL SHAPES

	Base per Lb.
Pittsburgh, Chicago, Gary, Buffalo, Bethlehem or Birmingham	2.10c.
Philadelphia, del'd	2.215c.
New York, del'd	2.27c.
On cars dock Gulf ports	2.45c.
On cars dock Pacific ports	2.70c.

STEEL SHEET PILING

	Base per Lb.
Pittsburgh, Chicago or Buffalo	2.40c.
On cars dock Gulf ports	2.85c.
On cars dock Pacific ports	2.90c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., per gross ton	$40.00
Angle bars, per 100 lb	2.70

F.o.b. Basing Points

Light rails (from billets) per gross ton	$40.00
Light rails (from rail steel) per gross ton	39.00

	Base per Lb.
Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast ports	2.25c.
Track bolts, to steam railroads	4.15c.
Track bolts to jobbers, all sizes (per 100 counts)	65.5

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; on tie plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon Pa., Richmond, Va.

SHEETS

Hot Rolled

	Base per Lb.
Pittsburgh, Gary, Birmingham, Buffalo, Sparrows Point, Cleveland, Youngstown, Middletown or Chicago	2.10c.
Detroit, delivered	2.20c.
Philadelphia, delivered	2.27c.
Granite City	2.20c.
On cars dock Pacific ports	2.60c.
Wrought iron, Pittsburgh	4.10c.

Cold Rolled*

Pittsburgh, Gary, Buffalo, Youngstown, Cleveland, Middletown or Chicago	3.05c.
Detroit, delivered	3.15c.
Granite City	3.15c.
Philadelphia, delivered	3.37c.
On cars dock Pacific ports	3.65c.

* Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base.

Galvanized Sheets, 24 Gage

Pittsburgh, Chicago, Gary, Sparrows Point, Buffalo, Middletown, Youngstown or Birmingham	3.50c.
Philadelphia, delv'd	3.67c.
Granite City	3.60c.
On cars dock Pacific ports	4.00c.
Wrought iron, Pittsburgh	6.10c.

Electrical Sheets
(F.o.b. Pittsburgh)

	Base per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extra plus 25c per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

Long Ternes

No. 24 unassorted 8-lb. coating f.o.b. Pittsburgh or Gary	3.80c.
F.o.b. cars dock Pacific ports	4.50c.

Vitreous Enameling Stock, 20 Gage*

Pittsburgh, Chicago, Gary, Youngstown, Middletown or Cleveland	3.35c.
Detroit, delv'd	3.45c.
Granite City	3.45c.
On cars dock Pacific ports	3.95c.

TIN MILL PRODUCTS

Tin Plate

	Per Base Box
Standard cokes, Pittsburgh, Chicago and Gary (100 lb.)	$5.00
Standard cokes, Granite City (100 lb.)	5.10

Special Coated Manufacturing Ternes

	Per Base Box
Granite City	$4.00
Pittsburgh or Gary	4.30

Roofing Terne Plate
(F.o.b. Pittsburgh per Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.90
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

Black Plate, 29 gage and lighter*

Pittsburgh, Chicago and Gary	3.05c.
Granite City	3.15c.
On cars dock Pacific ports, boxed	4.00c.

* Black plate base price applies to 29 gage within certain width and length limitations.

HOT ROLLED STRIP
(Widths up to 12 in.)

	Base per Lb.
Pittsburgh, Chicago, Gary, Cleveland, Middletown, Youngstown or Birmingham	2.10c.
Detroit, delivered	2.20c.
On cars dock Pacific ports	2.70c.

Cooperage Stock

Pittsburgh & Chicago	2.20c.

COLD ROLLED STRIP*

	Base per Lb.
Pittsburgh, Youngstown or Cleveland	2.80c.
Chicago	2.90c.
Detroit, delivered	2.90c.
Worcester	3.00c.

* Carbon 0.25 and less.

Commodity Cold Rolled Strip

Pittsburgh, Youngstown, or Cleveland	2.95c.
Detroit, delivered	3.05c.
Worcester	3.35c.

COLD ROLLED SPRING STEEL

		Pittsburgh and Cleveland	Worcester
Carbon	0.26-0.50%	2.80c.	3.00c.
Carbon	0.51-0.75	4.30c.	4.50c.
Carbon	0.76-1.00	6.15c.	6.35c.
Carbon	1.01-1.25	8.35c.	8.55c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh, Chicago, Cleveland and Birmingham)

To Manufacturing Trade

	Per Lb.
Bright wire	2.60c.
Galvanized wire, base	2.65c.*
Spring wire	3.20c.

* On galvanizing wire to manufacturing trade, size and galvanizing extras are charged, the price Nos. 6 to 9 gage, inclusive, thus being 3.15c.

To the Trade

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cut nails, carloads	3.85

	Base per 100 Lb.
Annealed fence wire	$3.05
Woven wire fence, 15½ gage and heavier base col.	67
Fence posts (carloads), base col.	69
Single loop bale ties, base col.	56
Galvanized barbed wire on 80-rod spools (carloads) base col.	70
Twisted barbless wire, base col.	70

Note: Birmingham base same on above items, except spring wire.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel In.	Black	Galv.	*Wrought Iron* In.	Black	Galv.
⅛	56	36	¼ & ⅜	+9	+30
¼ to ⅜	59	43½	½	24	6½
½	63½	54	¾	30	13
¾	66½	58½	1 & 1¼	34	19
1 to 3	68½	60½	1½	38	21½
			2	37½	21

Lap Weld

2	61	52½	2	30½	15
2½ & 3	64	55½	2½ to 3½	34½	17½
3½ to 6.66		57½	4	33½	21
7 & 8.65		55½	4½ to 8.32	32½	20
9 & 10.64	64½	55	9 to 12.	28½	15
11 & 12.63	63½	54			

Butt weld, extra strong, plain ends

⅛	54½	41½	¼ & ⅜	+10	+43
½ to ⅜	56½	45½	½	25	9
½	61½	53½	¾	31	15
¾	65½	57½	1 to 2	38	22½
1 to 3	67	60			

Lap weld, extra strong, plain ends

2	59	51½	2	33½	18½
2½ & 3	63	55½	2½ to 4.39	32½	25½
3½ to 6.66	64½	59	4½ to 6.37	32½	24
7 & 8.65	64½	56	7 & 8.	38	24½
9 & 10.64	64½	55	9 to 12.	32	20½
11 & 12.63	64½	54			

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount of $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher, on all butt weld 8 in. and smaller.

Boiler Tubes

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes. Minimum Wall. (Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Seamless Cold Drawn	Seamless Hot Rolled	Lap Weld Hot Rolled
1 in. o.d. 13 B.W.G.	$ 9.01	$ 7.82	....
1¼ in. o.d. 13 B.W.G.	10.67	9.26	....
1½ in. o.d. 13 B.W.G.	11.70	10.23	$9.72
1¾ in. o.d. 13 B.W.G.	13.42	11.64	11.06
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2¼ in. o.d. 13 B.W.G.	16.76	14.54	13.79
2½ in. o.d. 12 B.W.G.	18.45	16.01	15.16
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
2¾ in. o.d. 12 B.W.G.	21.42	18.59	17.54
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66
4½ in. o.d. 10 B.W.G.	43.04	37.35	35.22
5 in. o.d. 9 B.W.G.	54.01	46.87	44.25
6 in. o.d. 7 B.W.G.	82.93	71.96	68.14

Extras for less carload quantities:

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	30%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
*6-in. and larger, Birmingham	46.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	52.00
F.o.b. dock, Seattle	52.00
4-in. f.o.b. dock, San Francisco or Los Angeles	55.00
F.o.b. dock, Seattle	52.00

Class "A" and gas pipe, $3 extra 4-in. pipe is $3 a ton above 6-in.

Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is $45. Birmingham, and $53.80 delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	
½ in. and 6 in. and smaller	68½
Larger and longer up to 1 in.	66
1⅛ in. and larger	64
Lag bolts	66
Plow bolts, Nos. 1, 2, 3, and 7	68½
Hot pressed nuts, and c.p.c. and t-nuts, square or hex. blank or tapped:	
½ in. and smaller	67
9/16 in. to 1 in. inclusive	64
1⅛ in. to 1½ in. incl.	62
1⅝ in. and larger	60

On the above items with the exception of plow bolts, there is an additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for carload shipments.

	U.S.S.	S.A.E.
Semi-fin. hexagon nuts ½ in. and smaller	67	70
9/16 to 1 in.	64	65
1⅛ in. and larger	62	62

In full container lots, 10 per cent additional discount.

Stove bolts in packages, with nuts loose	72½
Stove bolts in packages, with nuts attached, add 15% extra.	
Stove bolts in bulk	83½

On stove bolts freight is allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland Chicago, Birmingham	$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 10

Cap and Set Screws

(Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.)

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller	50 and 10
Milled headless set screws, cut thread ¼ in. and larger	64
3/16 in. and smaller	73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller	70
Upset set screws, cup and oval points	75
Milled studs	52

Alloy Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem. Base price, $56.00 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base	2.70c.
Delivered, Detroit	2.80c.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2100 (1¼% Nickel)	$0.75
2200 (3½% Nickel)	1.55
2500 (5% Nickel)	2.25
31 Nickel-chromium	0.70
3200 Nickel-chromium	1.35
3300 Nickel-chromium	3.80
3400 Nickel-chromium	3.20
4100 Chromium-molybdenum (0.15 to 0.25 Molybdenum)	0.55
4100 Chromium-molybdenum (0.25 to 0.40 Molybdenum)	0.75
4340 Chr.-Ni.-Mo.	1.65
4345 Chro.-Ni.-Mo.	1.85
4600 Nickel - molybdenum (0.20 to 0.30 Mo. 1.50 to 2.00 Ni.)	1.10
5100 Chrome steel (0.60-0.90 Cr.)	0.35
5100 Chrome steel (0.80-1.10 Cr.)	0.45
6100 Chromium spring steel	0.15
6100 Chromium-vanadium bar	1.20
6100 Chromium-vanadium spring steel	0.85
Chromium-nickel vanadium	1.50
Carbon-vanadium	0.35

These prices are for hot-rolled steel bars. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. base per lb. Delivered Detroit, 3.45c., carlots.

STAINLESS & HEAT RESISTANT ALLOYS

(Base prices, cents per lb. f.o.b. Pittsburgh)

Chrome-Nickel

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25c.	24c.
Plates	29c.	27c.
Structural shapes	25c.	24c.
Sheets	36c.	34c.
Hot-rolled strip	23.50c.	21.50c.
Cold-rolled strip	30c.	28c.
Drawn wire	25c.	24c.

Straight Chrome

	No. 410	No. 430	No. 442	No. 446
Bars	18.50c.	19c.	22.50c.	27.50c.
Plates	21.50c.	22c.	25.50c.	30.50c.
Sheets	26.50c.	29c.	32.50c.	36.50c.
Hot stp.	17c.	17.50c.	24c.	35c.
Cold stp.	22c.	22.50c.	32c.	52c.

TOOL STEEL

High speed	67c.
High-carbon-chrome	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c a lb. higher.

British and Continental

BRITISH

Per Gross Ton f.o.b. United Kingdom Ports

Ferromanganese, export	£17 18s.
Tin plate, per base box	32s. to 33s.
Steel bars, open hearth	13£ 9s.
Beams, open hearth	12£ 2s. 6d.
Channels, open hearth	12£ 2s. 6d.
Angles, open hearth	12£ 2s. 6d.
Black sheets, No. 24 gage	17£ max.*; 17£ min.**
Galvanized sheets, No. 24 gage	19£ 10s. max.*; 19£ 10s. min.**

* Empire markets only.
** Other than Empire markets.

CONTINENTAL

Per Gross Ton, Belgian Francs f.o.b. Continental Ports

Bars, merchant	1500
Plates	1750
Joists	1475
Sheets, thin	1900

Above price are minimum base to which 100 francs should be added to cover war risk insurance, freight charges, etc.

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	$24.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa., and Sparrows Point, Md.	24.00
Delivered Brooklyn	26.50
Delivered Newark or Jersey City	25.53
Delivered Philadelphia	24.84
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	23.00
F.o.b. Buffalo	23.00
F.o.b. Detroit	23.00
Southern, delivered Cincinnati	23.06
Northern, delivered, Cincinnati	23.44
F.o.b. Duluth	23.50
F.o.b. Provo, Utah	21.00
Delivered, San Francisco, Los Angeles or Seattle	26.50
F.o.b. Birmingham*	19.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of 0.70 per cent and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same, except at Birmingham and Provo, which are not malleable iron basing points.

Basic

F.o.b. Everett, Mass.	$23.50
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	23.50
F.o.b. Buffalo	22.00
F.o.b. Neville Island, Erie, Pa., Toledo, Chicago, Granite City, Cleveland and Youngstown	22.50
Delivered Philadelphia	24.34
Delivered Canton, Ohio	23.89
Delivered Mansfield, Ohio	24.44
F.o.b. Birmingham	18.00

Bessemer

F.o.b. Buffalo	$24.00
F.o.b. Everett, Mass.	25.00
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	25.00
Delivered Newark or Jersey City	26.53
Erie, Pa., and Duluth	24.00
F.o.b. Neville Island, Toledo, Chicago and Youngstown	23.50
F.o.b. Birmingham	24.00
Delivered Cincinnati	24.11
Delivered Canton, Ohio	24.89
Delivered Mansfield, Ohio	25.44

Low Phosphorus

Basing points; Birdsboro, Pa., Steelton, Pa., and Buffalo	$28.50

Gray Forge

Valley or Pittsburgh furnace	$22.50

Charcoal

Lake Superior furnace	$27.00
Delivered Chicago	30.34

Canadian Pig Iron

Per Gross Ton

Montreal

Foundry iron	$27.50 base
Malleable	28.00 base
Basic	27.50 base

Toronto

Foundry Iron	$25.50 base
Malleable	26.00 base
Basic	25.50 base

On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload) $100.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	$32.00
Domestic, 26 to 28%	39.50

Electric Ferrosilicon

Per Gross Ton Delivered; Lump Size

50% (carload lots, bulk)	$69.50*
50% (ton lots, packed)	82.00*
75% (carload lots, bulk)	126.00*
75% (ton lots, packed)	142.00*

Bessemer Ferrosilicon

F.o.b. Furnace, Jackson, Ohio

Per Gross Ton

10.00 to 10.50% $32.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, $1 per ton additional.

Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 5.00 to 5.50% $27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are $1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, $1 a ton additional. Phosphorus 0.75% or over, $1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon	11.00c.*
2% carbon	17.50c.*
1% carbon	18.50c.*
0.10% carbon	20.50c.*
0.06% carbon	21.00c.*

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon	$98.00
2.50% carbon	103.00
2% carbon	108.00
1% carbon	118.00

Other Ferroalloys

Ferrotungsten, per lb. contained W del., carload	$2.00
Ferrotungsten, 100 lbs. and less	2.25
Ferrovanadium, contract, per lb. contained V., delivered	$2.70 to $2.90†
Ferracolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	$142.50
Ferrocarbontitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	$157.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with $3 unitage, freight equalized with Rockdale, Tenn., per gross ton	$58.50
Ferrophosphorus, electrolytic 23-26% in car lots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, $3 unitage, freight equalized with Nashville	$75.00
Ferromolybdenum, per lb. Mo. f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo. f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52% Mo. per lb. contained Mo. f.o.b. Langeloth, Pa.	80c.

* Spot prices are $5 per ton higher.
† Spot prices are 10c. per lb. of contained element higher.

*ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50%	$5.25
Old range, non-bessemer, 51.50%	5.10
Mesaba, bessemer, 51.50%	5.10
Mesaba, non-bessemer, 51.50%	4.95
High phosphorus, 51.50%	4.85

Foreign Ores*

C.i.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
Swedish, low P, 68% Fe	12c.
Swedish, basic or foundry, 65% Fe	11c.
Caucasian, washed, 52% Mn	49c.
African, Indian, 44 to 48% Mn	46c.
African, Indian, 49 to 51% Mn	48c.
Brazilian, 46 to 48% Mn	46c.
Cuban, del'd, duty free, 51% Mn	61c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	$23.00 to $24.00
Tungsten, domestic, scheelite delivered	23.00 to 25.00
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton: South African (low grade)	$19.00
Rhodesian, 45%	22.00
Rhodesian, 48%	26.00 to $27.00
Turkish, 48-49%	27.00 to 28.00
Turkish, 45-46%	25.00 to 26.00
Turkish, 40-41%	22.00
Chrome concentrates c.i.f. Atlantic Seaboard, per gross ton: Turkish, 48-49%	$27.00 to $28.00

* All foreign ore prices are nominal

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	$21.00
Domestic, f.o.b. Ohio River landing barges	21.00
No. 2 lump, 85-5, f.o.b. Kentucky and Ill. mines	$20.00 to 22.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic ports, duty paid	$25.00 to $25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	$31.00
ditto, in bags, f.o.b., same mines	$32.60

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J.	5.10c.
No. 6, f.o.b. Bayonne, N. J.	3.57c.
No. 5 Bur. Stds., del'd Chicago	3.25c.
No. 6 Bur. Stds., del'd Chicago	2.75c.
No. 3 distillate, del'd Cleve'd.	5.25c.
No. 4 industrial, del'd Cleve'd.	5.00c.
No. 5 industrial, del'd Cleve'd.	4.25c.
No. 6 industrial, del'd Cleve'd.	3.875c.

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, Prompt	$4.00 to $4.25
Foundry, f.o.b. Connellsville, Prompt	5.25 to 5.50
Foundry, by - product Chicago ovens	10.50
Foundry, by - product del'd New England	12.50
Foundry, by - product del'd Newark or Jersey City	11.38 to 11.90
Foundry, by - product Philadelphia	11.13
Foundry, by - product delivered Cleveland	11.05
Foundry, by - product delivered Cincinnati	10.50
Foundry, Birmingham	7.50
Foundry, by - product del'd St. Louis industrial district	10.75 to 11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports	14.75

IRON AND STEEL WAREHOUSES

PITTSBURGH*

	Base per Lb.
Plates	3.40c.
Shapes	3.40c.
Soft steel bars and small shapes	3.35c.
Reinforcing steel bars	2.70c.
Cold finished bars and screw stock	3.65c.
Hot rolled strip	3.60c.
Hot rolled sheets	3.35c.
Galv. sheets (24 ga.) 500 lb. to 1499 lb.	4.75c.
Wire, black, soft annealed	3.30c.
Wire, galv., soft	3.55c.
Track spikes (1 to 24 kegs)	3.60c.
Wire nails (in 100-lb. kegs)	2.80c.

On plates, structurals, bars, strip and hot rolled sheets, base applied to orders of 400 to 1999 lb.
On reinforcing bars base applies to orders of less than one ton and includes switching and starting charge.
All above prices for delivery within the Pittsburgh switching district.

NEW YORK

	Base per Lb.
*Plates, ¼ in. and heavier	3.76c.
*Structural shapes	3.75c.
*Soft steel bars, round	3.84c.
Iron bars, Swed. charcoal	9.50c.
**Cold-fin. shafting and screw stock:	
Rounds, squares, hexagons	4.09c.
Flats up to 12 in. wide	4.09c.
Cold-rolled strip soft and quarter hard	3.51c.
*Hot-rolled strip, soft O.H.	3.96c.
*Hot-rolled sheets (8-30 ga.)	3.58c.
**Galv. sheets (24 ga.)	5.23c.
**Galv. sheets (24 ga.)	4.75c. to 5.00c.
Cold-rolled sheets (20 ga.)	
Standard quality	4.60c.
Deep drawing	4.85c.
Stretcher leveled	5.10c.
SAE, 2300, hot-rolled	7.35c
SAE, 3100, hot-rolled	5.90c.
SAE, 6100, hot-rolled annealed	8.75c.
SAE, 2300, cold-rolled	8.59c.
SAE, 3100, cold-rolled, annealed	8.19c.
*Floor plate, ⅛ in. and heavier	5.56c.
Standard tool steel	12.50c.
Wire, black, annealed	4.85c
Wire, galv. (No. 9)	4.70c.
O. H. spring steel, flats	4.70c.
Common wire nails, per keg	3.50c.

*For lots 400 to 1999 lb.
**For lots less than 1500 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.55c.
Soft steel bars, rounds and angles	3.50c.
Soft steel squares, hexagons, channels and Tees	3.65c.
Hot rolled strip	3.60c.
Floor plates	5.15c.
Hot rolled sheets	3.35c.
Galvanized sheets	4.85c.
Cold rolled sheets	4.30c.
Cold finished carbon bars	3.75c.

Above prices are subject to deductions and extras for quantity and are f.o.b. consumer's plant within Chicago free delivery zone.

CLEVELAND

	Base per Lb.
Plates	3.40c.
Structural shapes	3.58c.
Soft steel bars	3.25c.
Cold-fin. bars (1500 lb., over.)	3.75c.
Hot-rolled strip	3.50c.
Cold rolled sheets	4.05c.
Cold-finished strip	3.20c.
Galvanized sheets (No. 24)	4.72c.
Hot-rolled sheets	3.35c.
Floor plates, 3/16 in. and heavier	5.18c.
Black ann'l'd wire, per 100 lb.	$3.10
No. 9 galv. wire, per 100 lb.	3.50
Com. wire nails, base per keg	2.75
Hot rolled alloy steel (3100)	5.85c.
Cold rolled alloy steel (3115)	6.75c.

Prices shown on hot rolled bars, strip, sheets, shapes and plates are for 400 to 1999 lbs. Alloy steel, 1000 lb. and over; galvanized sheets, 150 to 1499 lb.; cold rolled sheets, 400 to 1499 lb.

ST. LOUIS

	Base per Lb.
Plates and structural shapes	3.47c.
Bars, soft steel (round and flats)	3.62c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.77c.
Cold fin. rounds, shafting, screw stock	4.02c.
Galv. sheets (24 ga.)	4.52c.
Hot rolled sheets	3.38c.
Galv. corrugated sheets, 24 ga. and heavier*	4.57c.
Structural rivets	5.02c.

* No. 26 and lighter take special prices.

BOSTON

	Base per Lb.
Structural shapes, 3 in. and larger	3.85c.
Plates, ¼ in. and heavier	3.85c.
Bars	3.88c.
Heavy hot rolled sheets	3.71c.
Hot rolled sheets	4.21c.
Hot rolled annealed sheets	4.61c.
Galvanized sheets	4.61c.
Cold rolled sheets	4.71c.

The following quantity differentials apply: Less than 100 lb., plus $1.50 per 100 lb.; 100 to 399 lb. plus 50c.; 400 to 1999 lb. base; 2000 to 9999 lb. minus 20c.; 10,000 to 39,999 lb. minus 30c.; 40,000 lb. and over minus 40c.

BUFFALO

	Base per Lb.
Plates	3.62c.
Floor plates	5.25c.
Struc. shapes	3.40c.
Soft steel bars	3.35c.
Reinforcing bars (20,000 lb. or more)	2.15c.
Cold-fin. flats, squares, rounds, and hex.	3.65c.
Hot-rolled sheets, 3/16 x 14 in. to 48 in. wide incl., also sizes No. 8 to 30 ga.	3.35c.
Galv. sheets (24 ga.)	4.70c.
Bands and hoops	3.82c.

NEW ORLEANS

	Base per Lb.
Mild steel bars	4.20c.
Reinforcing bars	3.24c.
Structural shapes	4.10c.
Plates	4.10c.
Hot-rolled sheets, No. 10	4.35c.
Steel bands	4.75c.
Cold-finished steel bars	5.10c.
Structural rivets	4.85c.
Boiler rivets	4.85c.
Common wire nails, base per keg	3.55
Bolts and nuts, per cent off list	60

REFRACTORIES PRICES

Fire Clay Brick

	Per 1000 f.o.b. Works
Super-duty brick, at St. Louis	$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement per net ton (Eastern)	8.55

Chrome Brick

	Net per Ton
Standard f.o.b. Baltimore, Plymouth Meeting and Chester	$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

	Net per Ton
Standard f.o.b. Baltimore and Chester	$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

	Net per Ton
Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

* None available.

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	3.55c.
*Structural shapes	3.55c.
*Soft steel bars small shapes, iron bars (except bands)	3.85c.
‡Reinforc. steel bars, square and deformed	2.76c.
Cold-finished steel bars	4.16c.
*Steel hoops	4.35c.
*Steel bands, No. 12 and 3/16 in. incl.	3.85c.
*Spring steel	5.00c.
*Hot-rolled anneal. sheets	3.55c.
†Galvanized sheets (No. 24)	4.75c.
*Diam. pat. floor plates, ¼ in.	5.25c.

*For quantities between 400 and 1999 lb.
†For 10 bundles or over.
‡For one to five tons.

BIRMINGHAM

	Base per Lb.
Bars and bar shapes	3.50c.
Structural shapes and plates	3.55c.
Hot rolled sheets No. 10 ga.	3.35c.
Galvanized sheets No. 24 ga. or more	4.75c.
Strip	3.60c.
Reinforcing bars	3.50c.
Floor plates	5.88
Cold finished bars	4.43
Machine and carriage bolts	.50 & 10 off list
Rivets (structural) $4.60 base	

On plates, shapes, bars, hot-rolled strip, heavy hot-rolled sheets, the base applies on 400 to 1999 lb. All prices are f.o.b. consumer plant.

PACIFIC COAST

	Base per Lb. San Francisco	Los Angeles	Seattle
Plates, tanks and U. M.	4.00c.	3.80c.	3.40c.
Shapes, standard	4.00c.	3.80c.	3.50c.
Soft steel bars	4.00c.	3.95c.	4.00c.
Reinforcing bars, f.o.b. cars dock Pacific ports	2.525c.	open.	2.975c.
Hot-rolled sheets (No. 10)	3.85c.	4.10c.	3.70c.
Galv. sheets (No. 24 and lighter)	5.15c.	5.00c.	4.75c.
Galv. sheets (No. 22 and heavier)	5.40c.	5.00c.	4.75c.
Cold-finished steel			
Rounds	6.80c.	6.60c.	7.00c.
Squares and hexagons	8.05c.	7.85c.	8.25c.
Flats	8.55c.	8.35c.	8.25c.
Common wire nails—base per keg less carload	3.25c.	3.25c.	3.15c.

All items subject to differentials for quantity.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	4.10c.
Structural shapes	4.00c.
Plates	4.00c.
Cold-finished bars	4.83c.
Hot-rolled annealed sheets, No. 24	4.75c.
Galvanized sheets, No. 24	5.00c.

On mild steel bars, shapes and plates the base applies on 400 to 14,999 lb. On hot-rolled sheets, galvanized sheets and cold-rolled sheets base applies on 15,000 lb. and over. Base on cold-finished bars is 1000 lb. and over of a size.

DETROIT

	Base per Lb.
Soft steel bars	3.43c.
Structural shapes	3.65c.
Plates	3.60c.
Floor plates	5.27c.
Hot-rolled sheets, 8 to 30 gages above 12 in. and 3/16 in., 24 in. to 48 in. wide	3.43c.
Cold-rolled sheets	4.50c.
*Galvanized sheets	4.84c.
Hot rolled strip, under 12 gage	3.68c.
Hot rolled strip, above 12 gage	3.43c.
Cold-finished bars	3.80c.
Cold-rolled strip	3.40c.
Hot-rolled alloy steel (SAE 3100 Series)	5.97c.
Cold-rolled alloy (SAE 2300)	8.45c.

Quantity extras apply to all items.
*Price applies only in metropolitan Detroit.

REINFORCING STEEL

. . . Awards of 6200 tons; 9600 tons in new projects

ATLANTIC STATES
AWARDS

910 Tons, Perth Amboy, N. J., Thomas Edison bridge, to Bethlehem Steel Co., Bethlehem, Pa.

810 Tons, Kington, Pa., Toby Outlet Works, to P. S. Flanigan, Reading, Pa.

500 Tons, Hartford, Conn., housing project, to Scherer Steel Co., Hartford.

420 Tons, Green Haven, N. Y., State prison buildings, to Concrete Steel Co., New York.

400 Tons, Holyoke, Mass., housing project, to Truscon Steel Co., Boston; Casper Ranger Construction Co., Holyoke, contractor.

400 Tons, Hartford, Conn., South Meadows housing project, to Bethlehem Steel Co., Bethlehem, Pa.

365 Tons, Sayreville, N. J., Raritan River bridge, construction No. 6, to Bethlehem Steel Co., Bethlehem, Pa.; J. G. English, Inc. and Joseph Nesto & Co., contractors.

100 Tons, Weston, Mass., metropolitan water project, Charles River shaft, to Concrete Steel Co., Boston.

SOUTH AND CENTRAL

600 Tons, Ironton, Ohio, flood wall, to Pollak Steel Co., Cincinnati.

160 Tons, Gates Mills, Ohio, State bridge, project No. 264, to Builders Structural Steel Co., Cleveland, through Holmes Construction Co., Wooster, Ohio.

150 Tons, Woodward, Okla., bridge, to Sheffield Steel Co., Kansas City.

150 Tons, Tularosa, N. M., bridge and box culverts on route 70, to Darbyshire-Harvey Co., El Paso, Tex., through Dudley Stone Products Co., Santa Fe., N. M., contractor.

137 Tons, Columbus, Ohio, factory for Columbus Coated Fabrics Co., to Joseph T. Ryerson & Son, Inc., Chicago, through Leo E. Ruisinger.

WESTERN STATES

630 Tons, Los Angeles, Cahuenga Boulevard improvement, to Blue Diamond Corp., Los Angeles, through J. E. Haddock, Ltd., Pasadena, Cal., contractor.

230 Tons, Bremerton, Wash., quay walls, to Bethlehem Steel Co., Seattle, through General Construction Co., Seattle, contractor.

118 Tons, Lincoln County, Ore., remodeling bridge over Depoe Bay, to Mercer Steel Co., Portland, Ore., through Odom Construction Co., Oregon City, Ore., contractor.

109 Tons, King County, Wash., bridges on State highway 15, near Stevens Pass auto camp, to Northwest Steel Rolling Mills Co., Seattle, through Tony Romano, sub-contractor.

PENDING REINFORCING BAR PROJECTS
ATLANTIC STATES

1250 Tons, Rockaway, N. Y., Long Island Railroad grade elimination, cont. No. 2; bids Feb. 28.

120 Tons, Milford, Conn., bridge at Housatonic Junction.

SOUTH AND CENTRAL

1500 Tons, Evanston, Ill., Northwestern Institute of Technology.

700 Tons, Chicago, subway, section D-2-A; bids Feb. 29.

600 Tons, Toledo, Ohio, low pressure pumping station; bids Feb. 28.

500 Tons, Huntington, W. Va., flood wall.

500 Tons, Toledo, high pressure pumping station; bids Feb. 28.

400 Tons, Louisville, Ky., bottling plant for Seagram & Co.; J. A. Utley, contractor.

350 Tons, Gary, Ind., Delaney Community housing project; Powers Thompson Construction Co., Juliet, Ill., low bidder.

300 Tons, Gary, Ind., relief sewer, Rhode Island Street; Public Construction Co., Hammond, Ind., low bidder.

300 Tons, Toledo, chemical building, contract AA; bids March 6.

275 Tons, Taos, N. M., bridges on route 64; Henry Thygesen & Co., Albuquerque, N. M., contractor.

250 Tons, Hammond, Ind., sewage treatment plant, Bass Engineering Co., Detroit, low bidder.

212 Tons, Chicago, Dearborn-Wacker Garage.

200 Tons, Omaha, Neb., Logan-Fontanella housing project.

104 Tons, Evanston, Ill., John M. Smyth Co., addition.

WESTERN STATES

650 Tons, Pit River bridge, Shasta Dam, Central Valley project, to American Bridge Co., Pittsburgh.

245 Tons, Yountville, Cal., barracks at Veteran's Home; James I. Barnes, Santa Monica, Cal., low bidder on general contract.

234 Tons, Clyde, Cal., Central Valley Project (Invitation 49107-A); bids in.

225 Tons, Sunnyvale, Cal., Moffet Field laboratory; James I. Barnes, Santa Monica, Cal., contractor.

195 Tons, Hickam Field, T. H., equipment repair buildings; bids March 1.

190 Tons, Kettle Falls, Wash., Kettle Falls bridge; bids Feb. 27.

150 Tons, Berkeley, Cal., building at California School for Deaf; K. E. Parker Co., San Francisco, low bidder on general contract.

143 Tons, Sawyer, Wash., Yakima Project (Invitation 13697-A).

135 Tons, Port Chicago, Cal., Central Valley Project (Invitation 49103-A).

105 Tons, Alameda, Cal., barracks wing at Naval air base (Specifications 9549); Johnson, Drake & Piper, Oakland, Cal., contractors.

. . . PIPE LINES . . .

Northern Pipeline Co., Casper, Wyo., R. H. Nichols, Casper, president, recently organized, plans new welded steel pipe line from Billy Creek, Wyo., gas field area to Casper, about 100 miles, for natural gas transmission. New company will furnish service at Sheridan and Buffalo, Wyo., and main lines will be built to these points. Work is scheduled to begin in May. Cost over $500,000 with booster stations, control and meter houses and other operating facilities.

Memphis Natural Gas Co., Sterick Building, Memphis, Tenn., plans extensions and replacements in main welded steel pipe line from Monroe, La., to Memphis, used for natural gas transmission, with booster stations and other facilities to increase present capacity.

United States Engineer Office, Vicksburg, Miss., asks bids until Feb. 29 for 125 sections of 20-in. inside diameter steel shore pipe, each section 17 ft. long (Circular 159).

Salem, Ill., has engaged Caldwell Engineering Co., Jacksonville, Ill., consulting engineer, to make plans and surveys for pressure pipe line system for natural gas distribution, including main welded steel pipe line for connection with supply source, control and meter house, and other operating facilities. Cost estimated at $150,000. A bond issue in that amount is being arranged.

Bureau of Reclamation, Denver, asks bids until Feb. 26 for fabricated steel pipe for by-pass and air-inlet piping for main unit penstocks at Shasta Dam, Central Valley project, Cal., including fittings and accessories (Specifications 1330-D).

Corsicana, Tex., plans pressure pipe line system for natural gas distribution, including main welded steel line for connection with supply source, control and meter station, and other operating facilities. Travis Fullwood and J. Harry Burke are members of a special committee to secure estimates of cost and arrange details.

Longview, Tex., B. N. Taylor, city manager, is negotiating with United Gas Corp. for purchase of natural gas distributing system and will operate as municipal property in future. Extensions and replacements are planned, with additional operating facilities.

Constructing Quartermaster, Scott Field, Belleville, Ill., asks bids until Feb. 27 for construction and completion of pipe lines and other facilities for gasoline fueling system (Circular 6626-72).

Sinclair-Prairie Pipe Line Co., Gulf Building, Houston, Tex., affiliated with Sinclair-Prairie Oil Co., same address, has awarded contract to Monarch Construction Co., Palestine, Tex., for new welded steel pipe line from Long Lake, Tex., oil field district to connection with main pipe line system, about 40 miles, for crude oil transmission. A pumping station for booster service will be installed in oil field noted. New line will form a section of East Texas-Mexia trunk line system of company. Cost reported over $250,000.

CAST IRON PIPE

Pensacola, Fla., plans pipe line extensions in water system in new residential district in western part of city. Cost about $150,000 with service and operating facilities. Oliver J. Semmes, Jr., is city engineer.

Water and Light Commission, Marshfield, Wis., asks bids until March 1 for 3800 ft. of 6-in. for water system, including valves, fittings, etc. R. F. Cramer is secretary.

Waverly, Mo., is completing surveys for pipe lines for water system and other waterworks installation, and will carry out work in spring. Fund of about $100,000 is being arranged through bond issue and Federal aid for this and sewer system. Harrington & Cortelyou, Dwight Building, Kansas City, Mo., are consulting engineers.

Lewistown, Mont., plans call for bids early in March for about 7800 ft. of 8 and 4-in. pipe for extensions in water system. Joseph M. Schmit is city engineer.

Long Beach, Cal., plans about 1116 ft. of 12-in., 6675 ft. of 8-in., and 8850 ft. of 6-in. pipe, with valves, fittings, etc., for extensions in water system in parts of Lincoln, Arlington, Cameron and other streets.

Constructing Quartermaster, San Francisco and vicinity, Fort Mason, Cal., asks bids until Feb. 27 for 2½-in. pipe line system for water distribution at Army Air Corps radio range, Hamilton Field, Cal. (Circular 6616-54).

Tuscarawas, Ohio, plans pipe lines for water system and other waterworks installation, including 100,000-gal. reservoir and pumping station. Cost about $75,000. Financing is being arranged through Federal aid. H. S. Moore is engineer.

Pineville, N. C., has arranged with RFC for financing in amount of $99,000 for pipe lines for water system, elevated steel tank and tower, pumping station, and sewer system, work to be carried out soon. J. B. McCrary Co., Inc., Atlanta, Ga., is consulting engineer.

Great Falls, Mont., has authorized surveys and estimates of cost for new main trunk line, 16 or 20-in., for extensions in water system to West Great Falls and vicinity, work to be carried out during summer. Edward Henen is city engineer.

Los Angeles has awarded 265 tons of 16-in. pipe to American Cast Iron Pipe Co., Los Angeles, and 200 tons to United States Pipe & Foundry Co., San Francisco.

Cle Elum, Wash., has indefinitely postponed bids on 53,350 ft. of 4 and 6-in. water pipe, and valves, hydrants and fittings.

Spokane, Wash., will take bids Feb. 29 on 40,500 ft. of 6, 8, 10 and 12-in. cast iron, bell and spigot pipe.

TRADE NOTES

Miller & Zehrung Chemical Co., 1500 N. W. Lovejoy Street, Portland, Ore., has been appointed distributer for the Hanson-Van Winkle-Munning Co., manufacturer of electroplating equipment and supplies.

Hassel Iron & Metal Co., 1725 W. Canal Street, Milwaukee, has been organized by Ellis B. Hassel, formerly of Cohen Iron & Metal Co., for the wholesale handling of industrial scrap iron and metals.

E. A. Kinsey Co., Cincinnati, sales agent for heavy duty machine tools, mill supplies, abrasives and safety equipment, will move its Indianapolis branch on or about March 1 to 725 North Capitol Avenue, Indianapolis. President of the company is W. J. Radcliffe and Indianapolis manager is W. P. Burt.

Col. A. L. Mercer, president, and H. L. Trembicki, manager of the metal cleaning department of the Cowles Detergent Co., makers of industrial alkalies and soaps, 10525 Carnegie Avenue, Cleveland, announce appointment of the Eaton-Clark Co., 1490 Franklin Street, Detroit, as distributers of Cowles anhydrous metal cleaners.

THIS WEEK'S MACHINE . . . TOOL ACTIVITIES . . .

. . . Automobile companies planning extensive mechanical changes and are buying equipment for tooling new 1941 jobs . . . Aircraft industry buying still a dominant factor . . . General industrial demand being maintained . . . Foreign sales marking time.

Domestic Demand Maintained; Foreign Orders Ease Off

CINCINNATI — Recapitulation of the machine tool demand in the southern Ohio district, so far this quarter, indicates that the average is a trifle above the 1939 average. Of course, bookings are lagging behind the hectic rush of last September and October, but are being sustained well above the past year's level. Currently, there is a slight easing in the bookings during the past week, but this is merely looked upon as a normal fluctuation. Domestic demand is unchanged in the week's business, the fluctuation being largely in foreign demand. An automobile manufacturer was in the market for some broachers and milling machines, while continued activity from the aviation industry is reported. Easing of the foreign demand in some quarters is attributed to negotiations for changing contract conditions by French and English buyers and, with these ironed out, further ordering from these sources will be forthcoming.

With local plants running at full capacity and several interests contracting work to other areas, manufacturers indicate that shipments are still lagging behind and deliveries are still well extended. Labor supply is still reasonably adequate, although a more comfortable margin of skilled labor would be welcome.

Aircraft Plant Buying Features Cleveland Market

CLEVELAND—Buying by the aircraft parts industry has reached a new peak here, with one company distributing orders to a number of sellers for the largest machine tool program to break at one time in Cleveland in many years. One type of large equipment alone involves expenditure of over $500,000 and probably the whole project will be close to $1,000,000. There are certain conditional aspects to the matter, but evidently the project is in connection with the big aircraft production program being talked of for inauguration next October.

A fair volume of single machine sales has come from other plants here and in Lorain, Port Clinton, Akron, and Bedford. One machine tool producer in Cleveland bought heavily during the past week. Domestic commitments received up to Feb. 16 by a local producer equaled a month's production and on that date were almost equal to the January domestic volume, which in turn was 10 per cent over the production schedule.

Auto Plants Buying On 1941 Model Programs

DETROIT—An almost certain indication that Ford is going ahead with plans for the production of a new power plant (light six-cylinder engine and a transmission to go with it) is generally considered in Detroit as the start of a program which will lead to the introduction of a new type Ford car in the next year. The mechanical buying program is already in its initial stages. At the same time, Dodge is at a similar point in its program leading to the introduction of a new type transmission on Dodge cars similar to a transmission now available on a higher priced Chrysler line. As far as is known, this does not involve the use of the fluid flywheel or corresponding device. Buick is retooling on the Series 40 engine and on other units of the Buick 40 with greater output as one of the goals. More economy in production is also sought; at the same time, the design is being changed considerably.

Sales Holding Up Fairly Well at Chicago

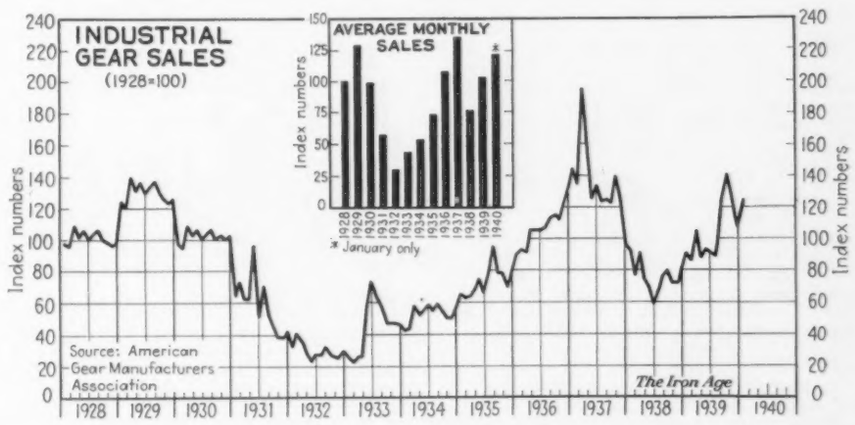
CHICAGO—Machine tool orders are being received at Chicago sales offices at a rate little changed from a week ago. Distribution continues good, and few large orders have come in or are pending. Activity in the Chicago industrial district has lessened considerably from a month ago, but many large machine tool users, such as makers of farm equipment, the Rock Island arsenal, and local railroad equipment shops are still quite busy. An announcement from Nash-Kelvinator that the Racine, Wis., plant, idle for two years, will be reopened soon, is regarded as an indication that all or part of the work on the projected light car will be carried on there. Machine tool orders thus far placed for the new car have no destination specified, it being assumed originally that all equipment would go to Kenosha.

Bridge Design Awards

PRIZES for the best design of a steel pedestrian bridge overpassing a vehicular express highway have been awarded by the American Institute of Steel Construction as follows: First prize, $200, Grant W. Voorhees, Iowa State College; second prize, $100, Vincent W. SeeBach, New York University; third prize, $50, Mae G. Greene, New York University. These awards were made by a jury of nationally-known architects and engineers.

Gear Buying Resumed Upward Trend in January

AFTER declining in November and December, sales of industrial gears turned upward in January and registered a gain of 11 per cent over the previous month, according to the American Gear Manufacturers Association. The index of gear sales for January stands at 123, as compared with 111 in December, 126 in November and 91 in January, a year ago. The highest index position recorded in 1939 was 141 in October and the low was 86 in February. The average for the year was 103.


INDUSTRIAL GEAR SALES
(1928=100)
AVERAGE MONTHLY SALES
Index numbers
* January only
Source: American Gear Manufacturers Association
The Iron Age
1928 1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939 1940

PLANT EXPANSION AND EQUIPMENT BUYING

NORTH ATLANTIC

Brewster Aeronautical Corp., 34-01 Thirty-eighth Avenue, Long Island City, aircraft equipment, airplane floats, tanks, etc., is negotiating with City Commission, Newark, N. J., for lease of municipal hangar at Newark Airport, about 150,000 sq. ft. of floor space, for new branch plant. Facilities will be provided for employment of about 5000 persons. Present Long Island City plant will be continued, pending construction later of a new plant in Newark Airport district, when entire works will be transferred to that location. Proposed plant will be one-story, totaling about 250,000 sq. ft. of floor space. Cost of latter project is estimated over $650,000.

Standard Brands, Inc., 595 Madison Avenue, New York, food products, has acquired about three acres on Moxley Street, Dallas, Tex., for new one-story branch plant. Cost over $100,000 with equipment. Company is now operating two plants at Dallas.

Public Works Office, Building No. 3, Brooklyn Navy Yard, asks bids until Feb. 28 for electrical installation for one-story turret and erection shop, 112 x 803 ft., with two one-story wing extensions, 112 x 803 ft., and 30 x 400 ft. respectively, and for crane runway extension, about 336 ft. long (Specification 9474).

Reynolds Metals Co., Inc., 539 West Twenty-fifth Street, New York, tin, aluminum and other metal foils, etc., has arranged for purchase of former assembling works at Louisville, consisting of a one-story structure, about 107,000 sq. ft. of floor space, and will improve for new plant. Company also has plans for another one-story plant at same place on Camp Ground Road, equipped as an aluminum rolling mill, lately noted in these columns. Cost of latter unit reported over $150,000 with machinery. With these new structures, company will have four plants at Louisville.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 27 for one motor-driven, ram-type milling machine (Schedule 786) for Brooklyn Navy Yard; until March 1, copper-nickel-alloy tubing (Schedule 796) for Brooklyn and Mare Island yards; air pressure gages (Schedule 766) for Philadelphia, Sewall's Point, San Diego and Puget Sound yards.

Mohawk Paper Mills, Inc., Saratoga Street, Cohoes, N. Y., has let general contract to J. P. Sewell, Hudson Avenue, Albany, N. Y., for three-story and basement addition, 50 x 160 ft. Cost over $75,000 with equipment. C. F. Egan, Burdett Building, Troy, N. Y., is architect.

Commanding Officer, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Feb. 29 for gray iron plate castings (Circular 462), work gages (Circular 460); until March 1 for 100 body yoke iron castings (Circular 464).

Sanitary Products Corp. of America, Inc., Lewis and Ashland Streets, Philadelphia, manufacturer of paper plates, utensils and other fiber products, has purchased 3½-acre tract at 333-35 North Avenue, Plainfield, N. J., improved with one-story buildings, totaling about 50,000 sq. ft. of floor space, and will improve for new branch converting plant.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Feb. 26 for eight sets of geometric chasers (Circular 1146).

Freihofer Baking Co., Twenty-seventh Street and Indiana Avenue, Philadelphia, has asked bids on general contract for new one-story baking plant, 100 x 200 ft. Cost close to $100,000 with traveling ovens, mixers, conveyors and other equipment.

E. Keeler Co., West Street, Williamsport, Pa., boilers and other plate products, is considering one-story addition and alterations and improvements in present works. Cost over $50,000 with equipment.

Public Works Office, Building No. 1, Philadelphia, asks bids until Feb. 28 for two double-cased deep wells, with motor-driven pumping machinery and accessories, including suitable housings for latter equipment (Specifications 9647).

Bethlehem Steel Co., Bethlehem, Pa., has let general contract to Henry L. Streeter Corp., Elmira, N. Y., for one-story addition, 80 x 425 ft., to wire rope division plant at Williamsport, Pa., for storage and distribution. Cost over $200,000 with equipment.

BUFFALO DISTRICT

American Bridge Co., Elmira Heights, Elmira, N. Y., has approved plans for one-story extensions and improvements in local plant. Cost close to $100,000 with equipment.

United States Engineer Office, Federal Building, Buffalo, asks bids until Feb. 27 for two 1½-ton ratchet lever chain-type hoists; one-ton ball-bearing chain hoist; four hardened steel worms; four cast iron worm gears; four cast-iron spur gears, and one 120-ft. steel rack (Circular 101).

NEW ENGLAND

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 26 for punches and dies (Circular 285), gages for checking forgings, thread plug gages, double end, thread ring, and adjustable snap gages, etc. (Circular 280), four motor-driven, manual tilting, oblique tumblers (Circular 273), 24-in. portable bandsaw, portable bench saw, self-feed roll-type rip saw, and 36-in. band saw (Circular 285); until Feb. 29 for 27,918 ejector clips (Circular 284).

General Electric Co., Pittsfield, Mass., plans one-story addition to plastic products plant. Cost over $50,000 with equipment.

New York, New Haven & Hartford Railroad Co., New Haven Conn., has let general contract to George F. Collins Co., Inc., Grand Central Terminal, New York, for one-story shop addition at locomotive and car repair plant, East Hartford, Conn. Cost close to $40,000 with equipment.

Public Works Officer, Building No. 39, Boston Navy Yard, asks bids until Feb. 27 for two-story shop at dry dock, South Boston (Specifications 9669).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 27 for one vertical cylindrical-type, tempering, electric furnace (Schedule 789), two motor-driven shapers (Schedule 780) for Boston yard.

WASHINGTON DIST.

Quartermaster, Headquarters of Third Corps Area, Post Office Building, Baltimore, asks bids until Feb. 27 for one 5-cu. yd. crawler type tractor-trail builder-scraper, ¾-yd. power shovel, motor grader with scarifier attachment, 5-ton tandem road roller, three-wheel 5-ton road roller, three-wheel 10-ton road roller with scarifier, and 34-ton low platform-type trailer (Circular 53-30).

Eastern Shore Public Service Co., Salisbury, Md., has arranged financing in amount of $1,000,000 for expansion and improvements in steam-electric power plant at Vienna, Md., operated in name of Delmarva Power Co., a subsidiary. Engineering Department, Utility Management Corp., Reading, Pa., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 27 for brass machine and steel cap screws, machine screw nuts, copper tacks, chain connecting links, steel oilers, liquid sprayers and other equipment (Schedule 3897); until Feb. 28 for 50,000 ft. of flexible armored cable, 50,000 ft. of flexible portable cord, 9400 ft. of copper cable, 400 lb. of trolley wire, 1000 lb. of magnet wire (Schedule 3906); until Feb. 29, steel hose clamps, oil-burning hand lanterns, steel-wire brushes, bronze barrel bolts, foot bolts and other equipment (Schedule 3903); until March 1, four 42-in. motor-operated sluice gates (Schedule 3905).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 27 for two motor-driven drilling machines (Schedule 805) for Washington yard; motor-driven turret lathe (Schedule 797) for Charleston, S. C., yard; cadmium plating machine (Schedule 753); until March 1, spare parts for airplanes (Schedules 900-3073 and 900-3074) for Eastern and Western yards; 34-in. snapbolt, swivel-eye hooks, with rings (Schedule 5516) for Sewall's Point yard.

SOUTH CENTRAL

Hardwick Stove Co., Cleveland, Tenn., has let general contract to G. C. Lee, Cleveland, for three-story addition, 70 x 150 ft., to be used as a machine shop. Cost close to $60,000 with equipment.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Feb. 26 for segmental valves, bulkheads and bulkhead recess seals for navigation lock at Kentucky dam; until Feb. 28, wall quoin castings, miter sills and pintle shoes for upper and lower lock gates for same dam.

Coca-Cola Bottling Co., 1533 Bank Street, Louisville, plans new one-story mechanical-bottling plant, for which bids will be asked on general contract late in March. Cost about $75,000 with equipment. Jesse M. Shelton, Bona-Allen Building, Atlanta, Ga., is architect and engineer.

SOUTH ATLANTIC

Constructing Quartermaster, MacDill Field, Tampa, Fla., asks bids until Feb. 27 for one double-diaphragm gasoline engine-driven pump, centrifugal gasoline engine-driven pump (Circular 6899-20).

H. H. Claussen Bakery Co., 1589 Broad Street, Augusta, Ga., has let general contract to Claussen-Lawrence Construction Co., 1394 Gwinnett Street, for one-story addition. Cost over $50,000 with ovens, conveyors and other mechanical equipment.

SOUTHWEST

Handlan, Inc., 212 North Third Street, St. Louis, railway supplies and equipment, has let general contract to Murch-Jarvis Co., Railway Exchange Building, for new one-story plant, 153 x 160 ft. Cost over $60,000 with equipment. H. S. Van Hoefen, Railway Exchange Building, is architect.

Consolidated Chemical Laboratories, Inc., 112 South Main Street, Little Rock, Ark., industrial chemicals, etc., has acquired three one-story buildings on South Vandeventer Street, and will remodel for expansion. Cost over $40,000 with equipment.

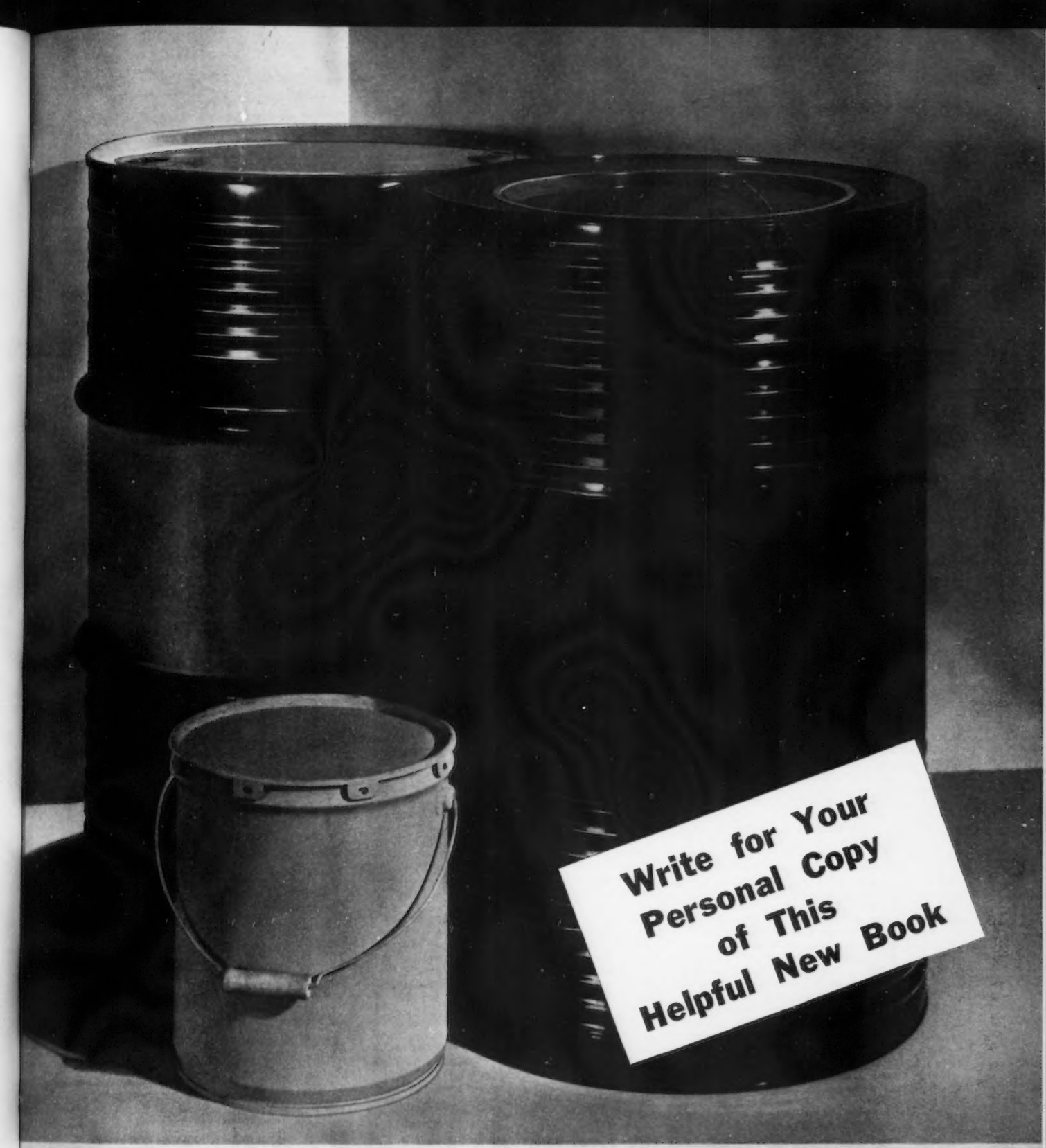
Emmett Barton, Seventh Street and Choctaw Avenue, Chickasha, Okla., plans one-story machine shop. Boyd Parks, engineer, is in charge of construction. Cost close to $40,000 with equipment.

Rio Grande By-Products Corp., McAllen, Tex., E. W. Linnard, secretary, plans new citrus fruit processing plant for extraction of by-products for medicinal and other purposes, with steam power house, mechanical shop and other units. Cost over $350,000 with equipment.

San Antonio Machine & Supply Co., San Antonio, Tex., plans new one-story plant at Water Street and Cooper's Alley. Cost close to $40,000 with equipment. Brock, Roberts & Anderson, Jones Building, Corpus Christi, Tex., are architects.

National Aircraft Corp., Trinity Building, Fort Worth, Tex., plans expansion and improvements in airplane-manufacturing plant at San Antonio, Tex., for increase in parts production and assembling divisions. Cost about $150,000 with equipment.

Roeser & Pendleton, Inc., Palestine, Tex., has let general contract to Stearns-Roger Mfg. Co., 1718-20 California Street, Denver, for new gas recycling plant in Cayuga oil field district, Anderson County, Tex., with compressor



DRUM MAKING MACHINES

This new book contains material to help manufacturers of steel drums, containers and pails, in working out their production set-up. It is completely illustrated with production flow charts and photographs of machines for performing each operation.

It shows each step from the first flat steel sheet to the finished product.

The book is divided into three thumb-indexed sections, covering Heavy Gage Drums, Light Gage Drums and Pails.

Machines are shown for a wide range of production requirements. They range from manually operated to power driven machines and semi- and full-automatic types.

This new book gives in condensed form the results of long experience in designing, building and applying Niagara equipment for drum and pail making. It is offered as a service to manufacturers—write for your personal copy.

NIAGARA MACHINE & TOOL WORKS, BUFFALO, N. Y.

Branches: Cleveland — Detroit — New York

station and other structures. Cost about $130,000.

WESTERN PA. DIST.

Pennsylvania Power Co., 19 East Washington Street, New Castle, Pa., will take bids soon on general contract for one and two-story equipment, maintenance and repair building, 129 x 355 ft., with service and garage facilities for company motor trucks and cars. Cost about $175,000 with equipment. C. C. Kresbach is company architect.

Poplar Auto Parts Co., Walnut and West Twelfth Streets, Erie, Pa., plans one-story and basement storage and distributing building, 40 x 165 ft. Cost close to $45,000 with equipment.

Duquesne Brewing Co., Twenty-second and Mary Streets, Pittsburgh, will soon begin superstructure for one-story and basement addition, 32 x 105 ft., for new mechanical-bottling unit, for which general contract recently was let to Navarro Corp., 6219 Broad Street. Cost over $60,000 with equipment. F. Bollinger Co., Duss Avenue, Ambridge, Pa., is engineer.

OHIO AND INDIANA

Empire Plow Co., 3140 East Sixty-fifth Street, Cleveland, agricultural implements, has asked bids on general contract for one-story addition, 70 x 100 ft. Cost close to $50,000 with equipment. Steffens & Fox, 1940 East Sixth Street, are architects.

McPherson-Huff Tool Co., Sabina, Ohio, woodworking tools, hammers, chisels, etc., plans rebuilding part of one-story plant recently destroyed by fire. Loss over $75,000 with equipment.

Hooven - Owens - Renschler Co., Hamilton, Ohio, steam engines, air compressors, parts, etc., has let general contract to A. Benzing & Son, 709 South Ninth Street, for plant extensions and improvements. Cost over $45,000 with equipment. Fred G. Mueller, Hamilton Hotel, is architect.

Borden Co., 350 Madison Avenue, New York, milk products, has let general contract to W. J. Camlin, 68 Waldo Street, Newark, Ohio, for new one-story plant at South Third and Walnut Streets, Newark. Cost over $100,000 with equipment.

Contracting Officer, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 27 for one motor-driven sheet metal former (Circular 1071), six high-pressure pumps, six hydraulic drive fluid tanks (Circular 1067), five torque stand test tank assemblies (Circular 1068); until Feb. 28 for galvanized conduit, 6500 ft. of wire, 300 ft. of cable, power panel and other equipment (Circular 1072), airplane radiator assemblies (Circular 1060), 160 electric fans (Circular 1075); until Feb. 29 for 1525 starter attaching nut wrenches and 3050 generator attaching nut wrenches (Circular 1078); until March 1, hand-power brakes and folders, hand-power sheet metal brakes, hand-power bar folders, hand-power formers, lever punches, shears, squaring shears, motor-driven sheet metal machines and other tools (Circular 1089).

Motive Parts Co., 555 North Capitol Avenue, Indianapolis, automobile parts and equipment, has asked bids on general contract for three-story addition, 30 x 110 ft. Cost over $50,000 with equipment. Herbert Foltz & Son, Architects' and Builders' Building, are architects.

MICHIGAN DISTRICT

National Electric Welding Machines Co., Trumball Street, Bay City, Mich., has let general contract to Henry C. Weber Construction Co., Bay City, for one-story addition. Cost close to $40,000 with equipment.

Yard-Man, Inc., Jackson, Mich., lawn mowers and parts, has acquired former plant of Fox Machine Co. and will remodel for new works to double, approximately, present capacity. Removal of present plant will be carried out late in spring.

Purchasing and Contracting Officer, Air Corps, Selfridge Field, Mich., asks bids until March 4 for 18 5-ton push-type trolleys (Circular 1).

Gallmeyer & Livingston Co., Straight Avenue, Grand Rapids, Mich., grinding machines and parts, will begin superstructure soon for one-story addition, for which general contract has been let to Owen-Ames-Kimball Co., Grand Rapids. Cost close to $45,000 with equipment.

MIDDLE WEST

Winnebago Distilling Co., South Elgin, Ill., care of Paul Gerhardt, 457 West Fullerton Street, Chicago, architect, has asked bids on revised plans for new distillery at South Elgin, consisting of about 10 one-story buildings, with power house, machine shop and other mechanical units. Cost close to $900,000 with equipment.

Louis Sappanos Co., 1623 North Ogden Avenue, Chicago, paints, oils, etc., has asked bids on general contract for two-story and basement building, 50 x 100 ft., for storage and distribution. Cost close to $40,000 with equipment. Walter A. McDougall, 140 South Dearborn Street, is architect.

Commanding Officer, Ordnance Department, Rock Island Arsenal, Rock Island, Ill., asks bids until Feb. 26 for 3000 lb. of nails, 1000 safety nuts, 30,000 rivets, 30,000 lock washers, crow bars, punches, hammers, twist drills, wrenches, files and other equipment (Circular 669), angular hand-rolling fixture (Circular 672), steel die blocks (Circular 673), hand reamers (Circular 674), fuse junction boxes (Circular 676), nickel chromium seamless steel tubing (Circular 682).

Wisconsin Electric Power Co., 231 West Michigan Street, Milwaukee, has asked bids on general contract for addition to steam-electric power plant on North Commerce Street, 79 x 134 ft., and 110 ft. high, with two-story wing extension for machine shop. Fred Luber is company architect. Cost close to $100,000 exclusive of equipment.

Seven-Up Iowa Co., 1507 East Grand Street, Des Moines, Iowa, J. B. Maher, manager, recently organized, plans one and two-sory mechanical-bottling, storage and distributing plant. Cost over $75,000 with equipment.

City Council, Wymore, Neb., is arranging financing in amount of about $150,000 for expansion and improvements in municipal power plant, including additional equipment. E. R. Dunmire, 1802 B Street, Lincoln, Neb., is consulting engineer.

Standard Oil Co., 735 Federal Street, Davenport, Iowa, has let general contract to John Soller Construction Co., Old Masonic Temple Building, for new bulk oil storage and distributing plant at Bettendorf, Iowa. Cost about $75,000 with steel tanks and other equipment.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Feb. 27 for four single purchase hand winches, with wire rope drum not less than 9½ x 8 in. inside diameter, and lifting capacity not less than 1000 lb., with brake, suitable for mounting on concrete block under tower (Circular 171).

Perfex Corp., Milwaukee, manufacturer of radiators, will build a three-story addition, 43 x 101 ft., to its plant at 415 West Oklahoma Place. Herbert Tullgren is architect.

Cranberry Lake Development Co., Phelps, Wis., has plans for a one-story, 66 x 220 ft., structural steel or reinforced concrete warehouse, with 60 x 100 ft. wing. H. Hedler, Plymouth Building, Minneapolis, is manager. Donn Hougen, Wisconsin Rapids, Wis., is architect.

PACIFIC COAST

Harbor Department, San Diego, Cal., plans new steel hangars with repair and reconditioned facilities, control station, seaplane unit and wharf, with power and lighting facilities, at Lindbergh Air Field. Cost about $118,600. Financing in that amount has been arranged through Federal aid.

Fraser Furnace Co., Stockton, Cal., heating equipment and parts, care of Johnson & Mayo, 931 North El Dorado Street, architects, has let general contract to T. E. Williamson, Stockton, for new one-story plant, 150 x 155 ft. Cost about $65,000 with equipment.

Bureau of Reclamation, Denver, asks bids until Feb. 28 for one 200-ton, double-trolley, motor-operated, overhead traveling crane for Parker power plant, Parker dam project, California-Arizona (Specifications 1329-D).

Lockheed Aircraft Corp., Empire Avenue and Victory Place, Burbank, Cal., airplanes and parts, has asked bids on general contract for one-story addition, 75 x 250 ft. Cost over $100,000 with equipment. John and Donald B. Parkinson, Title Insurance Building, Los Angeles, are architects.

Northern Idaho Rural Electrification Rehabilitation Association, Sandpoint, Idaho, has engaged John W. Cunningham, Spalding Building, Portland, Ore., consulting engineer, to make surveys and plans for new hydroelectric power plant at Priest Lake, where site has been acquired. Cost about $150,000. Financing is being arranged through Federal aid.

Pacific Power & Light Co., Portland, Ore., is arranging fund of about $1,050,000 for expansion and improvements in power plants, power substations, transmission and distributing lines, and other properties.

FOREIGN

Department of Industry, Government of Sweden, Stockholm, has plans for new pig iron plant at Lulea, comprising group of one-story buildings, with blast furnaces, coke ovens and other facilities, for initial capacity of about 90,000 tons per annum. Furnace units will be designed to use coke or charcoal. Cost over $2,000,000 with equipment.

Cub Aircraft, Ltd., Adams Street, Hamilton, Ont., plans one-story factory on Dunsmuir Road for parts production and assembling. Cost close to $60,000 with equipment. Prack & Prack, 36 James Street, South, are architects.

Canadian Industries, Ltd., Burlington and Ottawa Streets, Hamilton, Ont., has awarded structural steel contract to Hamilton Bridge Co., Ltd., Hamilton, for $200,000 plant addition.

Machine Tool Index Unchanged in January

CLEVELAND—Machine tool production during January remained at the December rate of 93.3 per cent of capacity, according to the latest operating activity index of the National Machine Tool Builders' Association. The rate was 77 per cent ahead of January, 1939.

Marked progress has been made toward solving the problems created by the unprecedented demand for machine tools from both domestic and foreign customers, according to J. E. Lovely, president of the association.

"The industry has consistently endeavored to give domestic orders preference over foreign orders, with respect to delivery dates," Mr. Lovely said. "In spite of the insistent foreign demand, many companies are telling foreign buyers that future orders will have to wait until requirements of domestic customers have been met. Strenuous measures are being taken by the industry to increase output. New equipment has added substantially to plant facilities. In most cases it has seemed more practicable to secure the desired immediate set-up in production by increasing the productivity of existing plants, rather than attempting the building and equipping of new plants."